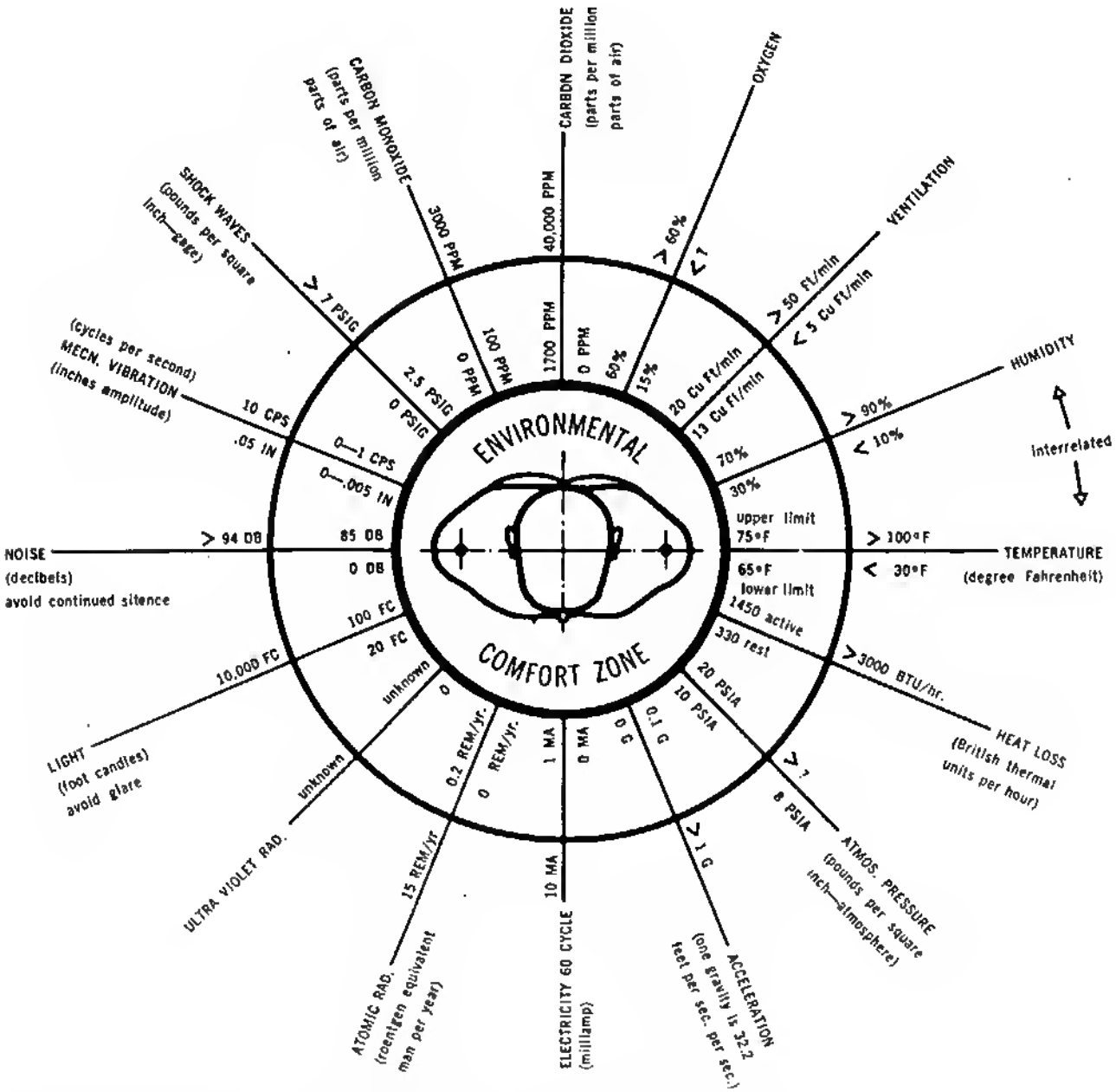
THE MEASURE OF MAN

HUMAN FACTORS IN DESIGN

HENRY DREYFUSS

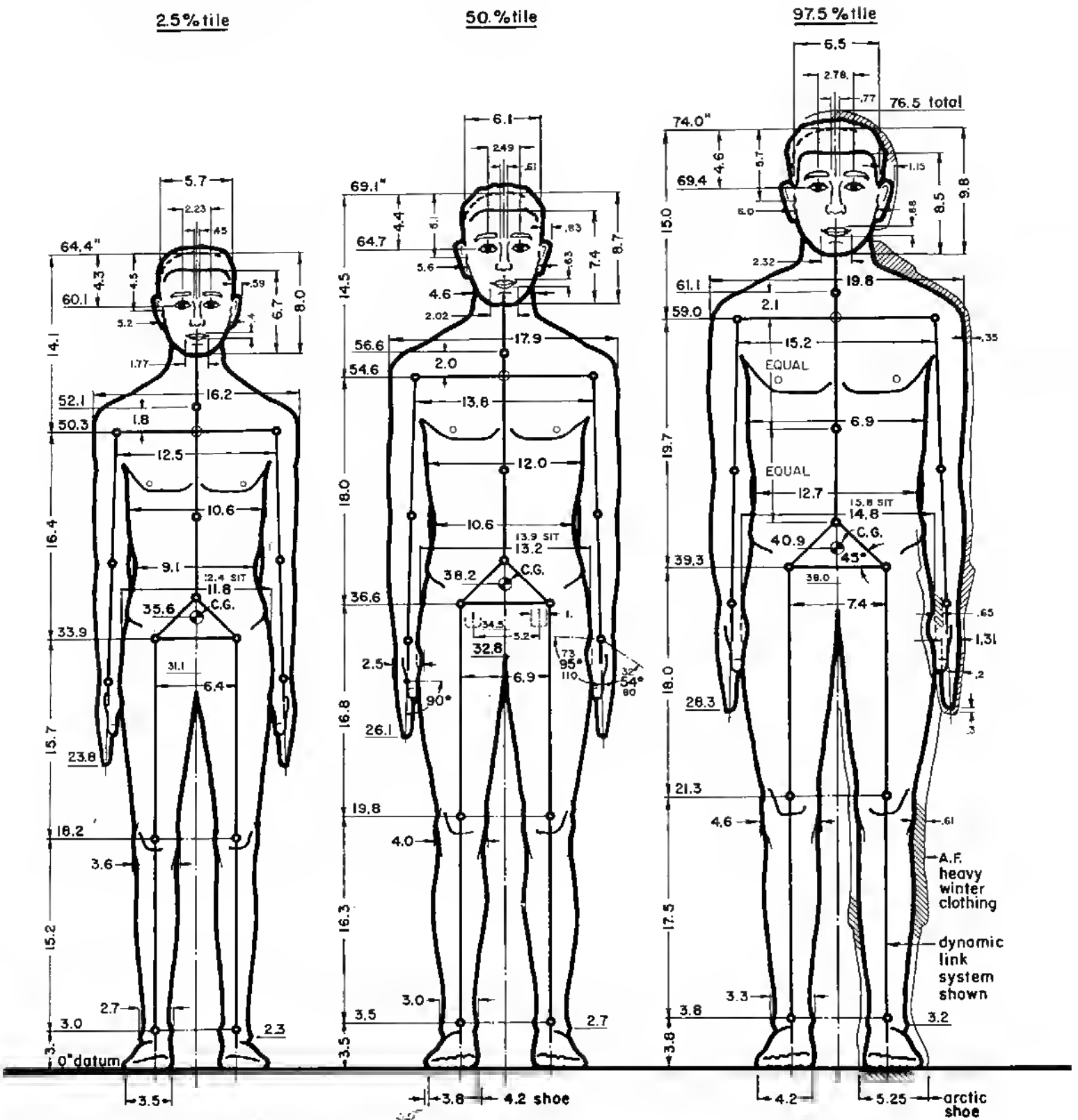


The first circle is the bearable zone limit. Outside this limit great discomfort or possible damage is encountered. It is also necessary to consider: infra-red radiation, ultra sonic vibration, noxious gases, dust, pollen, and heat exchange with liquids and solids.

Note: All data here are subject to qualification, refer to reference sources; for complete information see bibliography.

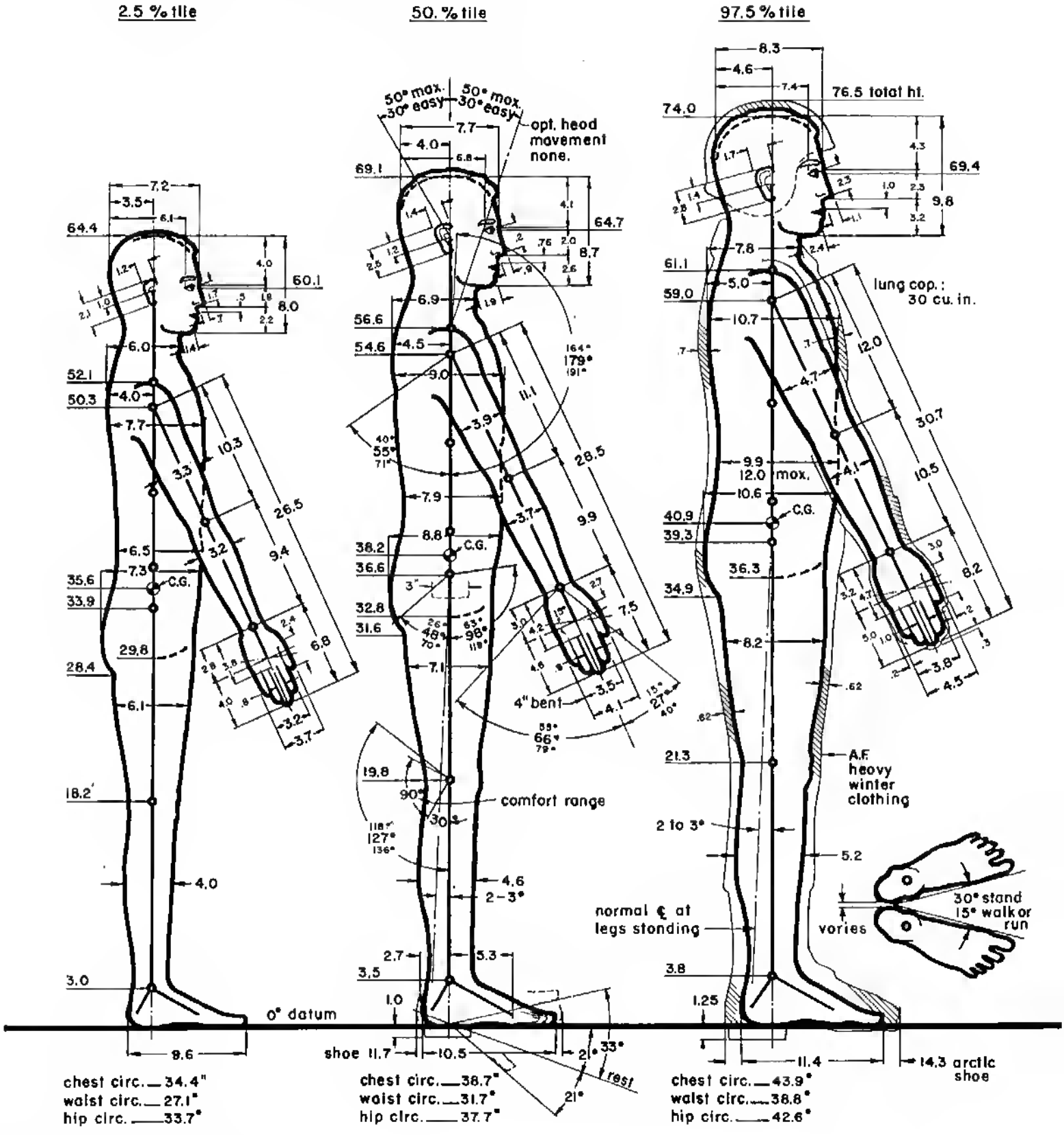
ANTHROPOMETRIC OATA — STANDING ADULT MALE

ACCOMMODATING 95% OF U.S. ADULT MALE POPULATION



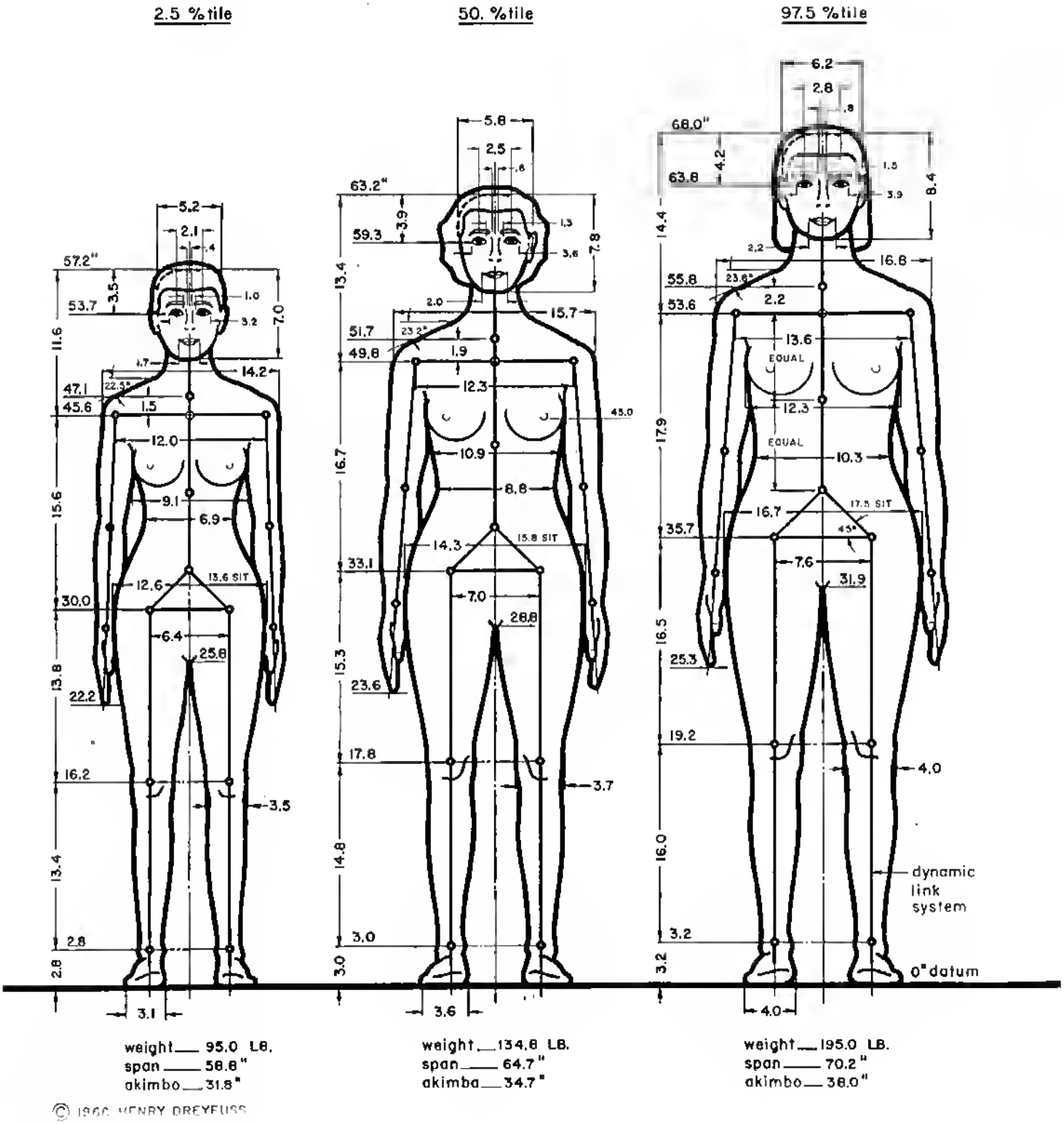
ANTHROPOMETRIC DATA – STANDING ADULT MALE

ACCOMMODATING 95% OF U.S. ADULT MALE POPULATION



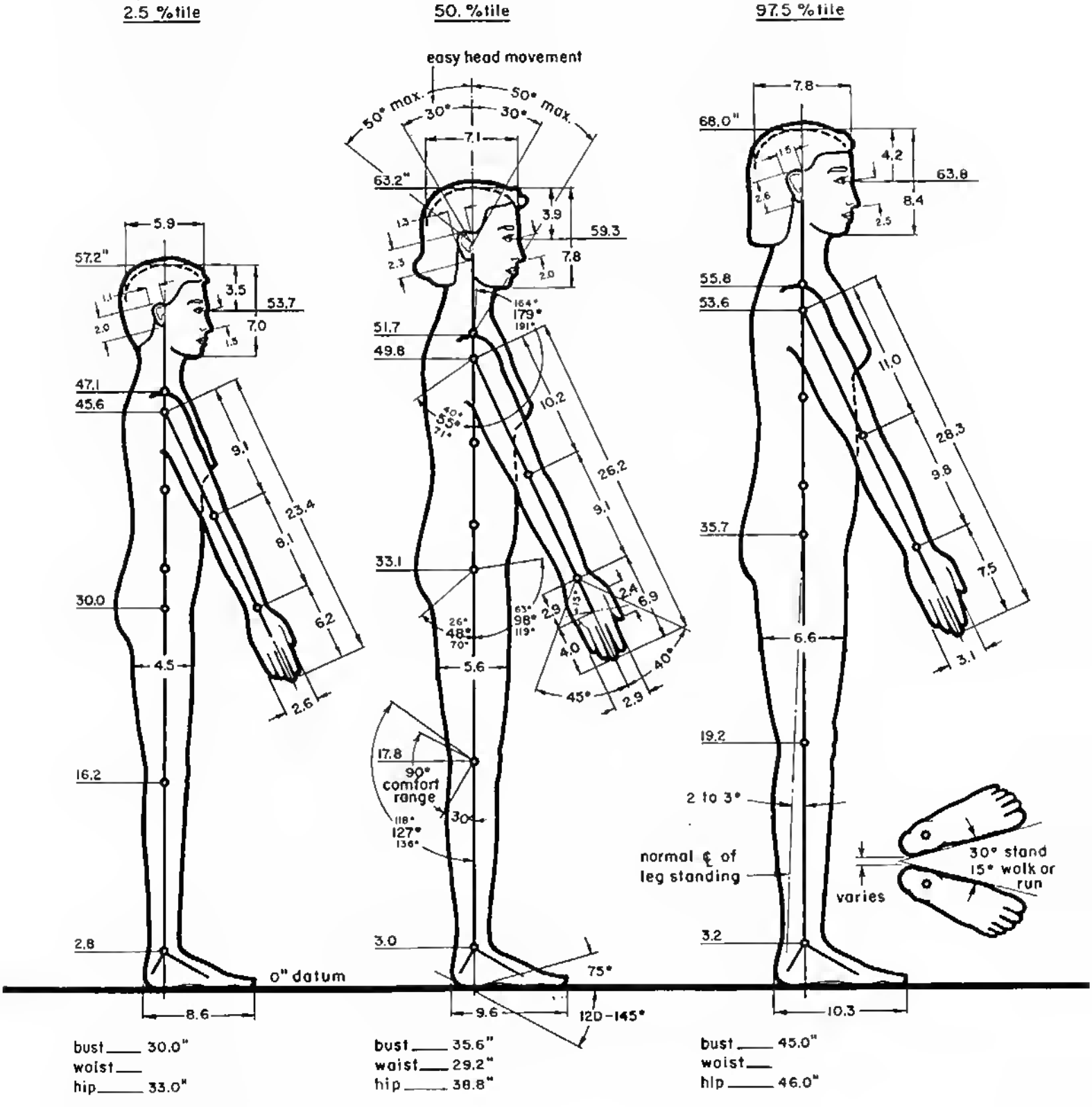
ANTHROPOMETRIC DATA — STANDING ADULT FEMALE

ACCOMMODATING 95% OF U.S. ADULT FEMALE POPULATION



ANTHROPOMETRIC DATA — STANDING ADULT FEMALE

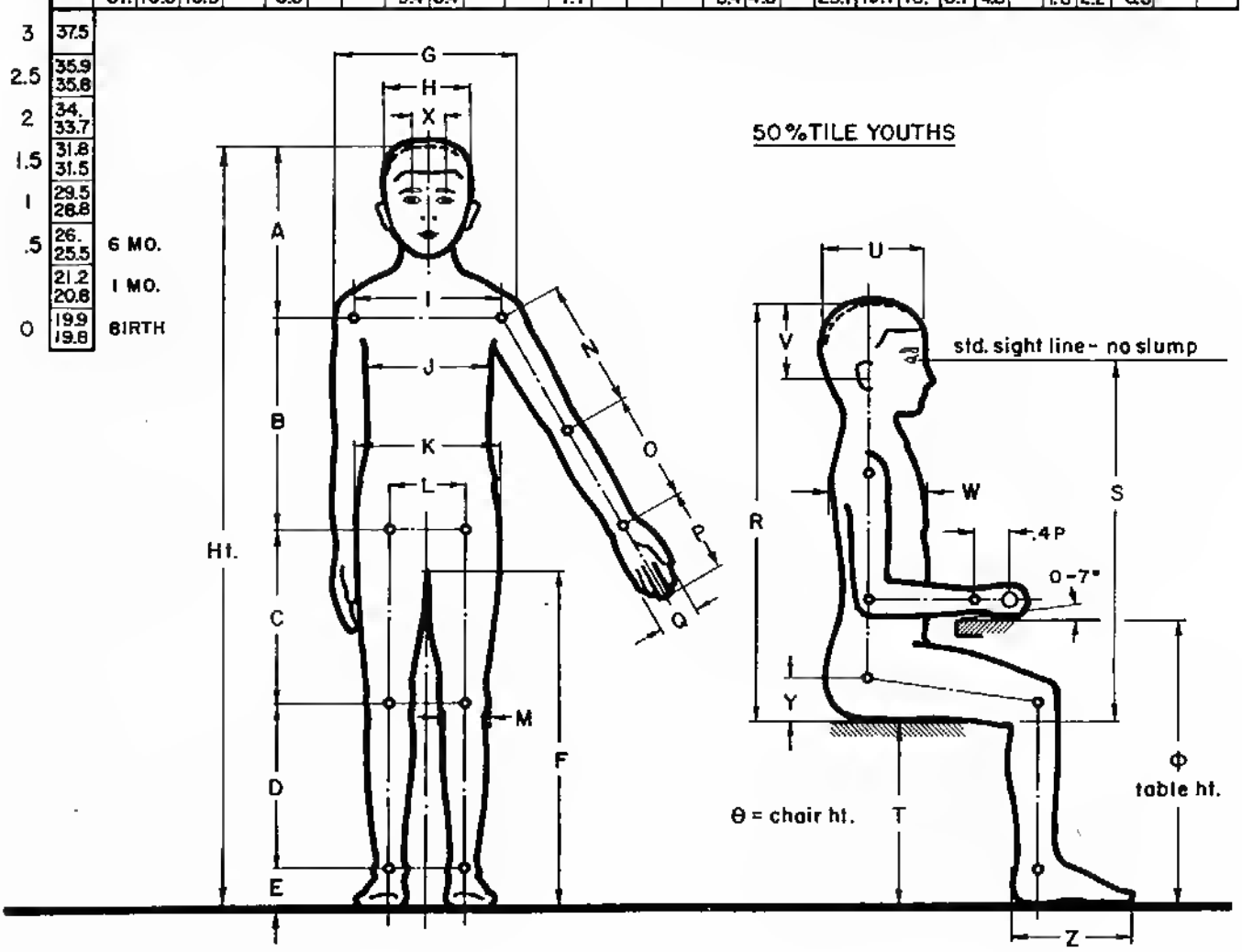
ACCOMMODATING 95% OF U.S. ADULT FEMALE POPULATION



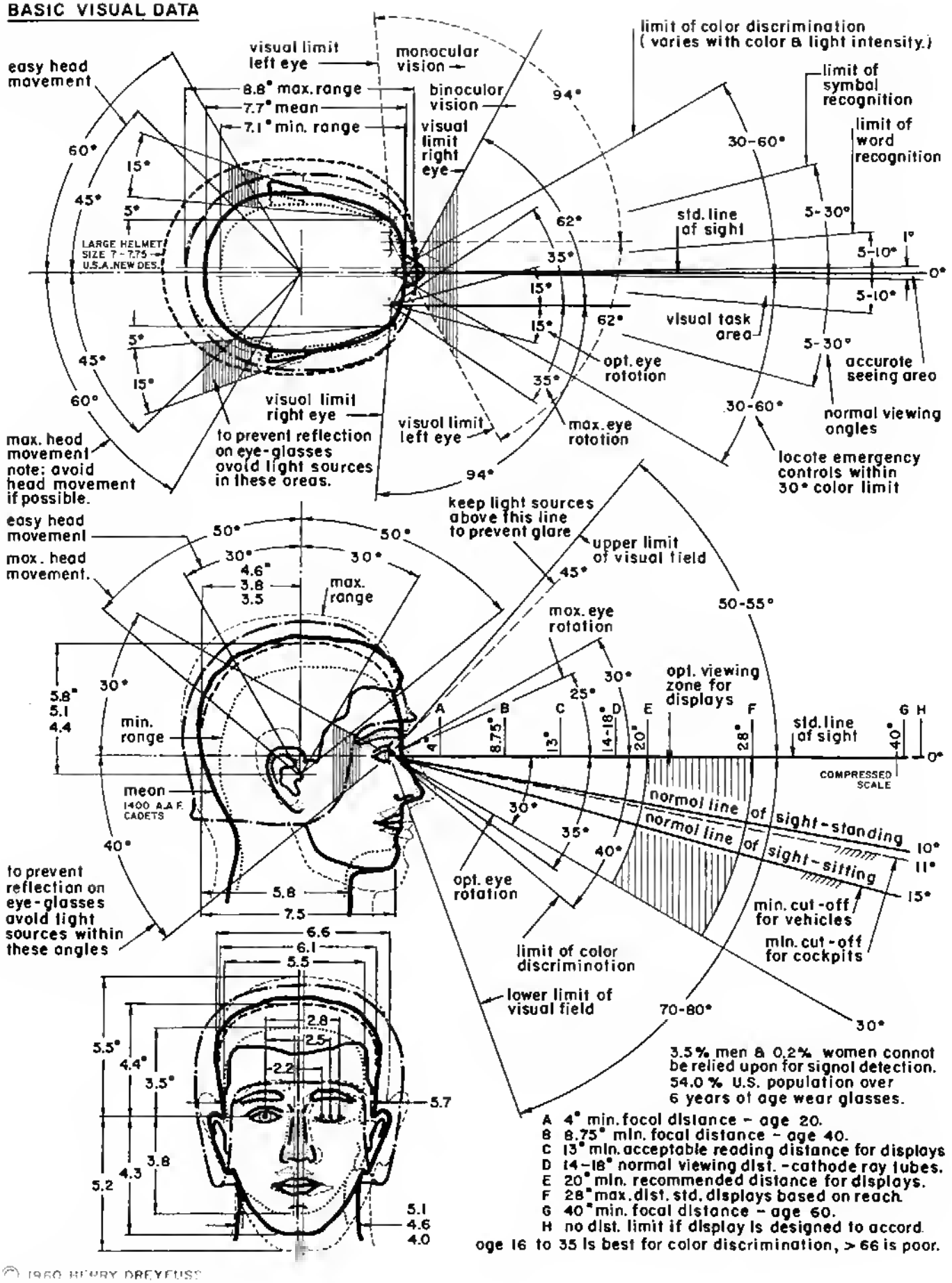
ANTHROPOMETRIC DATA – MALE AND FEMALE CHILDREN

top figure in box is data for boys, lower figure is for girls, and one figure applies to both.

Age	Ht.	Wt.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	θ	Φ
17	68.2 63.6	138. 119.	12.2 11.5	20.7 19.7	16.3 15.1	15.6 14.4	3.4 3.	31.7 28.9	15.7 14.4	6. 5.6		15.2 12.1	12.9		3.7	12.3 11.5	10. 9.1	7.6 7.		35.3 33.5	31.3 29.5	17. 16.	7.5 7.6	5.2 5.	7.6 6.7		2.9 2.6	10.1 9.5	16"	27"
16	67.3 63.5	132. 116.	11.8 11.3	20.5 19.8	16.2 14.9	15.5 14.5	3.3 5.	31.5 28.8	15.2 14.5	6. 5.6		12.8 12.1	12.7 12.8		3.7	12.2 11.7	9.9 9.1	7.6 7.		34.5 33.4	30.5 29.4	17. 15.5	7.6 7.5	5.2 5.	7.4 6.9		2.6 2.7	9.8 9.4		
15	65.6 65.2	122. 115.	11.1	20.1 19.7	15.9 14.9	15.2 14.5	5.5 3.	31. 28.9	14.7 14.2	5.9 5.8		12.4 11.9	12.3 12.7		5.7	11.9 11.5	9.7 9.	7.5 7.		33.4 55.	29.4 29.	16. 15.5	7.5 7.3	5.1 5.	7.2 6.8	2.3	2.7	9.5 9.3	15	25
14	63. 62.5	109. 106.	10.9 11.	19.2 18.8	15.1 15.2	14.6 14.3	3.2 3.	29.7 28.5	14.1 14.	5.8 5.7	11.	11.6 11.4	11.6 12.5	5.6	3.6	11.4	9.3 9.	7.2 6.8	3.	52.1 32.4	28.1 28.4	16. 15.	7.4 7.3	5.1 5.	6.9 6.7	2.2 2.3	2.6	9.1		
13	60.5 60.6	96. 100.	10. 10.2	17.9 19.	15.5 14.3	13.9 14.1	3.2 3.	28.5 28.2	13.5 15.6	5.6 5.7		11. 11.1	11. 11.8		3.5	10.7 11.	8.6	6.8		30.9 51.5	26.9 27.5	15.5 15.	7.4 7.2	5.1 5.	6.6 6.5	2.2	2.5	8.9	14	24
12	58.2 59.	86. 90.	10.8 10.8	17.1 17.9	13.9 14.5	13.5 15.5	5.1	27.5 27.4	13.	5.8 5.7		10.6 10.7	10.6 11.2		3.4	10.3 10.6	8.4 8.5	6.6		29.9 30.3	25.9 26.5	14.5 14.7	7.3 7.2	5.1 4.9	6.4 6.5	2.2	2.5	8.6 8.5		
11	56.2 56.5	77. 79.	10.6 10.4	16.6 16.8	15.5 13.4	12.7 12.8	3.	26.1 26.3	12.6 12.4	5.8 5.7	10.5	10.2 10.5	10.1 10.5	5.	5.3	9.9 10.	8.1	6.3 6.4	2.8	29.2 29.1	25.2 25.1	14. 14.4	7.5 7.1	5. 4.9	6.2 6.	2.2	2.5 2.4	8.4	15	22
10	54.3 54.2	71. 70.	10.6 10.4	15.9	12.7	12.2 12.5	2.9	25.1 25.	12.3 12.	5.8 5.6		9.9	9.8 10.		3.2	9.5	7.8 7.7	6.1		28.5 26.2	24.5 24.2	14. 15.	7.5 7.1	5. 4.9	6. 5.7	2.2 2.1	2.5 2.4	8.3		
9	52.4 52.	64. 63.	10.7 10.5	15.1	12.2 12.1	11.6 11.7	2.8	25.9 25.8	11.8 11.5	5.7 5.6		9.5	9.1 9.5		3.1	9.1	7.4 7.3	5.9 5.8		27.7 27.4	25.7 23.4	13.5 13.	7.2 7.	5. 4.9	5.8 5.5	2.1	2.4 2.5	7.9 8.	12.5	20.5
8	50.4 50.	58. 57.	10.6 10.2	14.5 14.4	11.5	11.1	2.7	22.7	11.4 11.1	5.7 5.6	9.2	9.2	9. 9.1	4.4	5.	8.7	7.1 6.9	5.7 5.6	2.5	27. 26.6	23. 22.6	15. 12.5	7.2 7.	5. 4.9	5.7 5.4	2.1	2.4 2.5	7.7		
7	48.2 47.9	53. 51.	10.7 10.3	13.6	10.8 10.9	10.5	2.6	21.5 21.4	10.9 10.7	5.7 5.5		8.6	8.7 8.8		2.9	8.2	6.8 6.6	5.4 5.5		26.1 25.7	22.1 21.7	12. 11.5	7.1 6.9	5. 4.8	5.5 5.4	2.1	2.4	7.4	11	16.5
6	46.1 45.8	48. 46.	10.6 10.4	12.7	10.3	9.8 9.9	2.5	20.2	10.4 10.2	5.6 5.5	8.5	8.5	8.3 8.4	4.1	2.8	7.6	6.1 6.2	5.1	2.5	25.4 25.	21.4 21.	11.6 11.	7.1 6.8	4.9 4.8	5.5 5.3	2.	2.4	7.		
5	43.9 43.6	43. 42.	10. 9.7	12.7	9.6	9.2	2.4	18.9 18.8	10.1 9.8	5.6 5.4		8.2	8. 8.1		2.7	7.	6. 5.9	4.9 4.8		24.5 24.3	20.5 20.3	11. 10.	7. 6.8	4.9 4.8	5.4 5.2	2. 1.9	2.5 2.4	6.8 8.8	10	17.5
4	40.9	58. 57.	10.4 10.5	11.1 10.9	8.8	8.4 8.5	2.2	17.2	9.7 9.4	5.6 5.4		7.9	7.4 7.7		2.7	6.4	5.6 5.4	4.7 4.6		25.5 23.1	19.5 19.1	9.5 10.	6.9 6.7	4.8 4.8	5.2	1.9 1.8	2.3 2.2	6.6 6.5		
3	37.5																													
2.5	35.9 35.8																													
2	34. 33.7																													
1.5	31.8 31.5																													
1	29.5 28.8																													
.5	26. 25.5	6 MO.																												
	21.2 20.6	1 MO.																												
0	19.9 19.8	BIRTH																												



BASIC VISUAL DATA



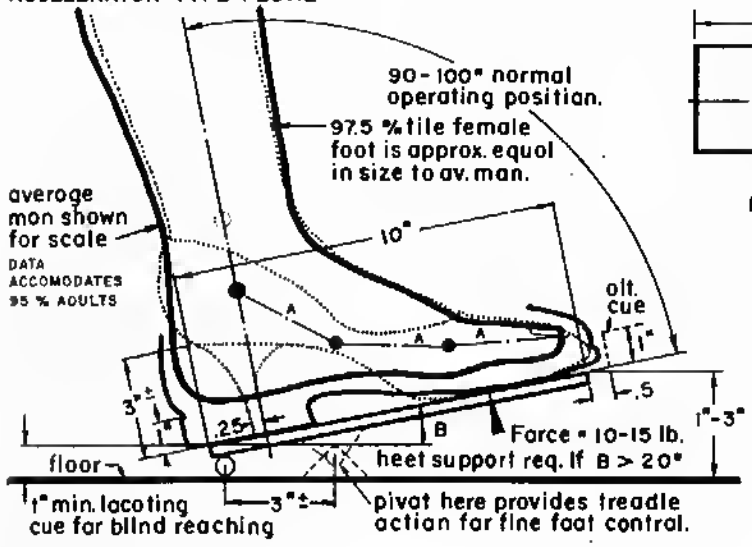
3.5% men & 0.2% women cannot be relied upon for signal detection.
54.0 % U.S. population over 6 years of age wear glasses.

A 4" min. focal distance - age 20.
B 8.75" min. focal distance - age 40.
C 13" min. acceptable reading distance for displays
D 14-18" normal viewing dist. - cathode ray tubes.
E 20" min. recommended distance for displays.
F 28" max. dist. std. displays based on reach.
G 40" min. focal distance - age 60.
H no dist. limit if display is designed to accord.

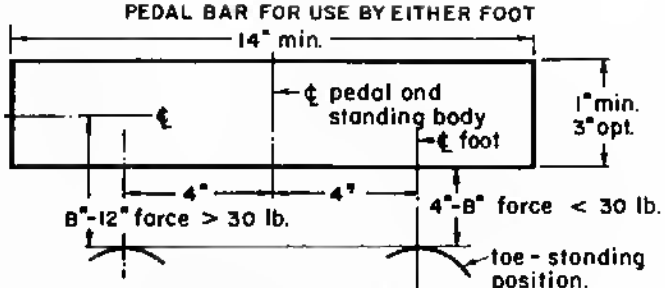
age 16 to 35 is best for color discrimination, > 66 is poor.

FOOT MEASUREMENTS AND BASIC FOOT CONTROLS

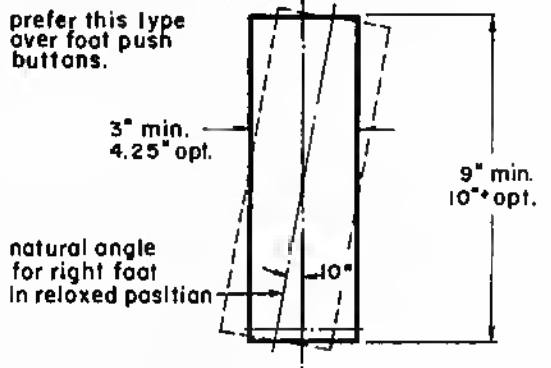
ACCELERATOR TYPE PEDAL



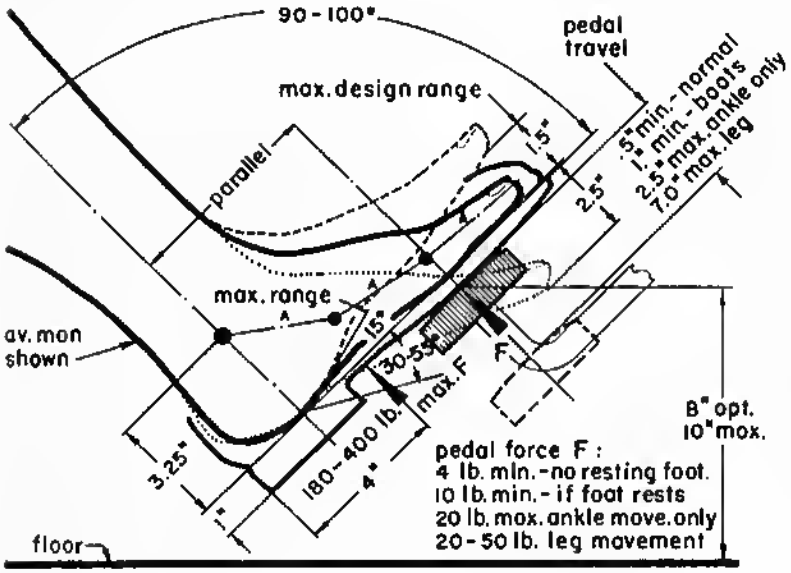
PEDAL BAR FOR USE BY EITHER FOOT



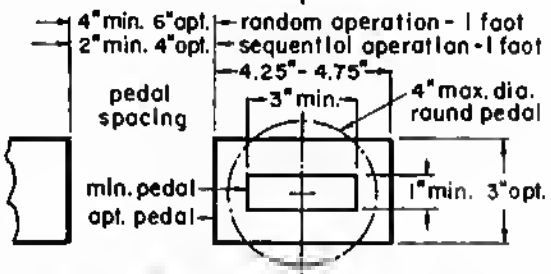
PEDALS - ACCELERATOR



BRAKE TYPE PEDAL

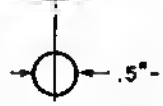


PEDALS - BRAKE TYPE

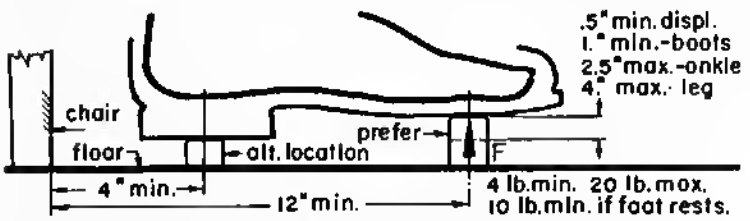


FOOT PUSH BUTTONS

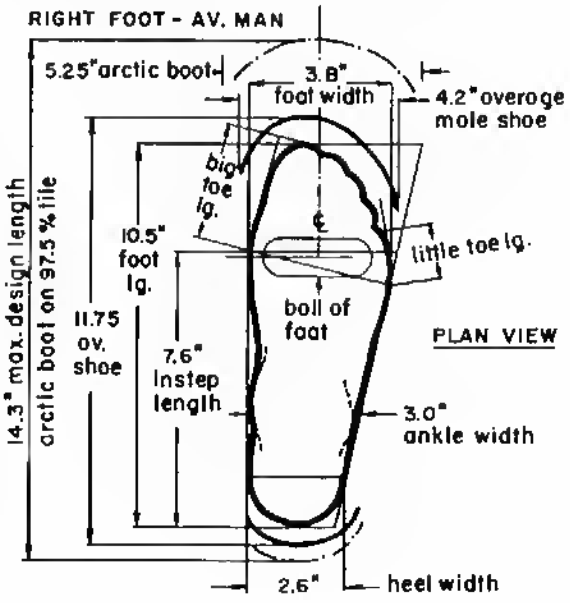
prefer ball of foot to heel operation.
provide snap feel.
use only if both hands are occupied, foot buttons are susceptible to accidental activation.



FOOT PUSH BUTTONS

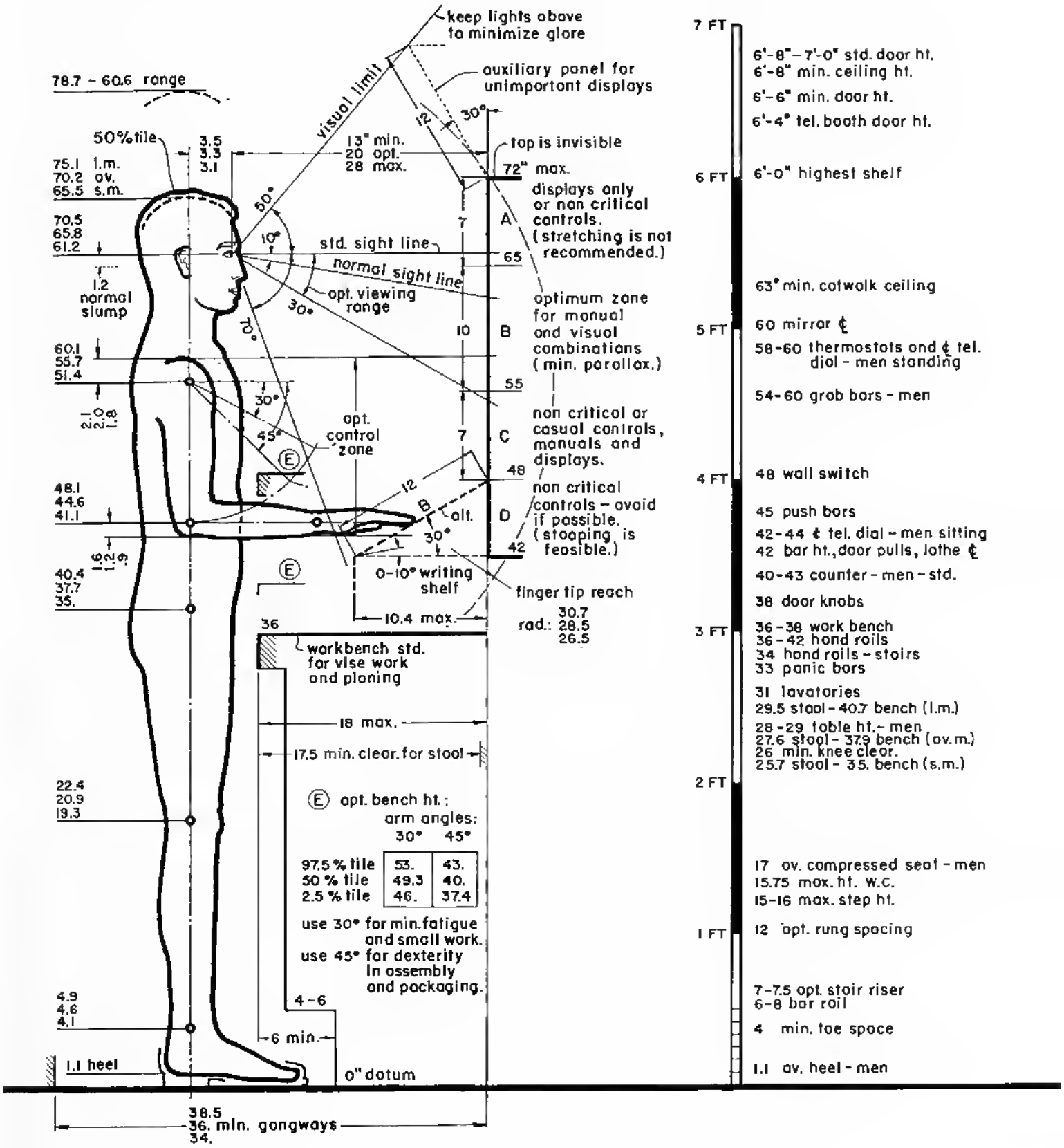


RIGHT FOOT - AV. MAN

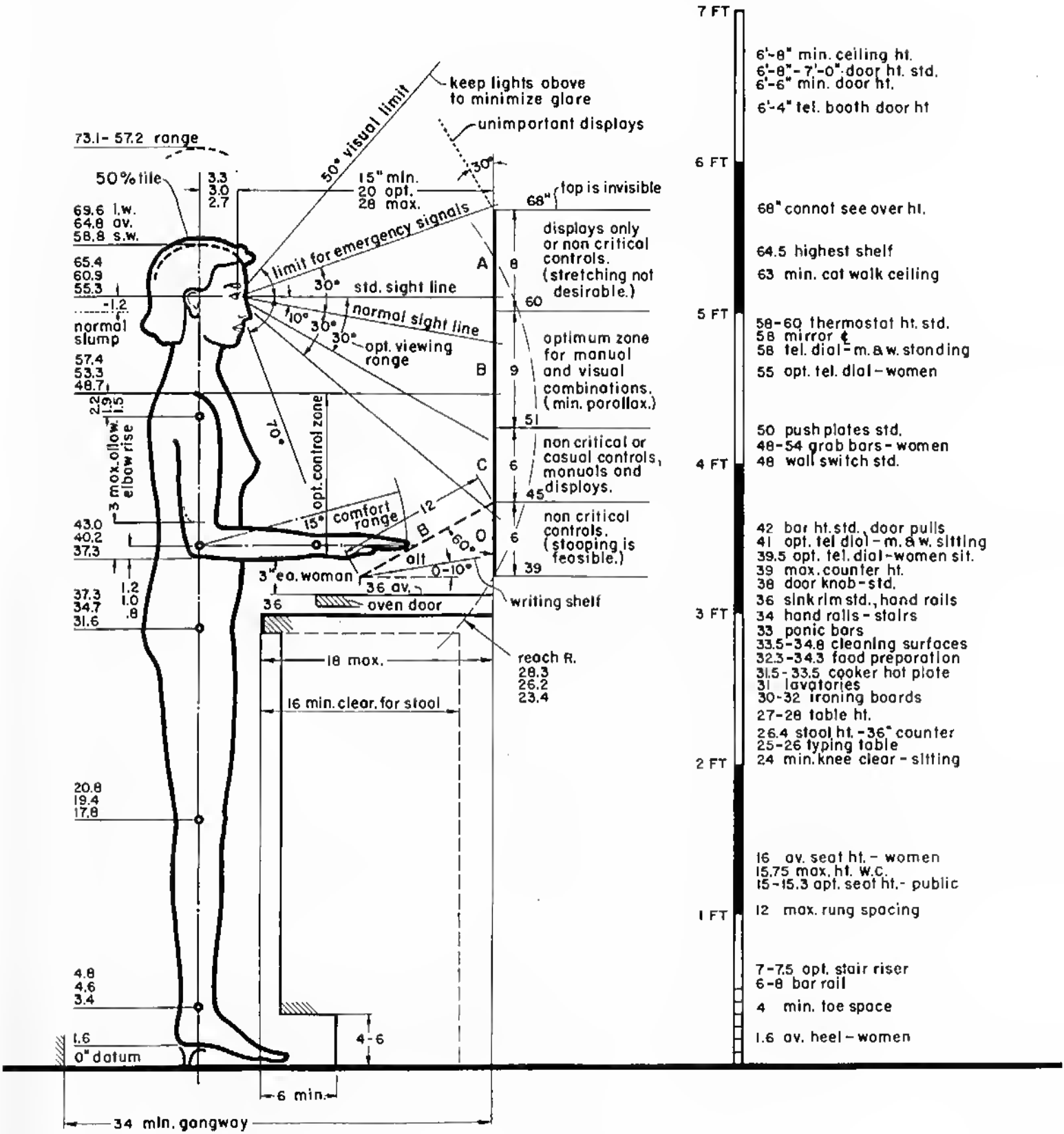


	MEN			WOMEN		
percentiles →	2.5 %	50 %	97.5 %	2.5 %	50 %	97.5 %
foot length	9.6"	10.5	11.4	8.6	9.6	10.3
foot width	3.5"	3.8	4.2	3.1	3.6	4.0
instep length	6.9"	7.6	8.3			
heel width	2.3"	2.6	2.9			
ankle width	2.7"	3.0	3.3			

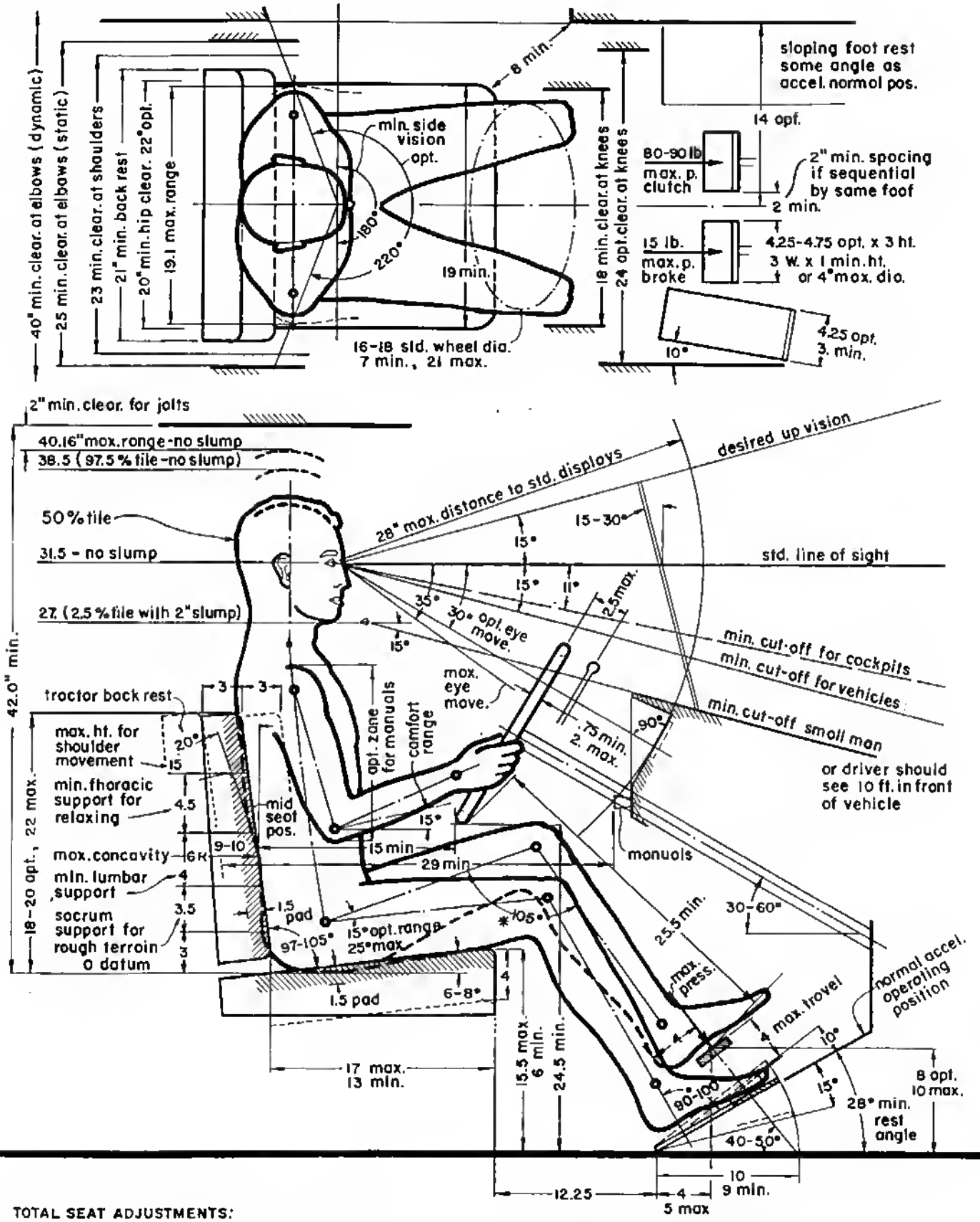
ANTHROPOMETRIC DATA — ADULT MALE STANDING AT CONTROL BOARD



ANTHROPOMETRIC DATA — ADULT FEMALE STANDING AT CONTROL BOARD



ANTHROPOMETRIC DATA — ADULT MALE SEATED IN VEHICLE



TOTAL SEAT ADJUSTMENTS:

horizontal: 6" min. in max. increments of 1"

vertical: 4" min. in max. increments of 1"

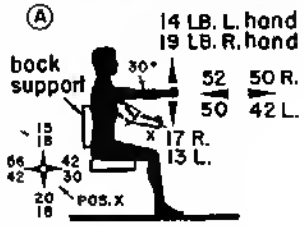
* leg angle 105-110° for max. pedal pressure 0-50 lb.
120° min. " " " " 50-100 lb.

HUMAN STRENGTH

(for short durations)

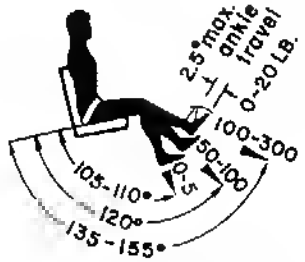
strength correction factors:
X 0.9 left hand and arm
X 0.84 hand-age 60
X 0.5 arm & leg-age 60
X 0.72 women

ARM FORCES SITTING

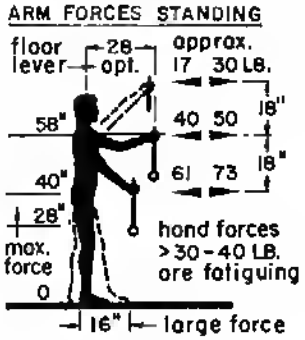


ARM FORCES SITTING

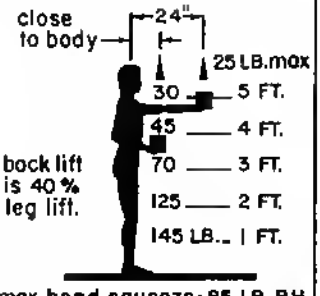
LEG FORCES SITTING



ARM FORCES STANDING



LIFTING FORCES

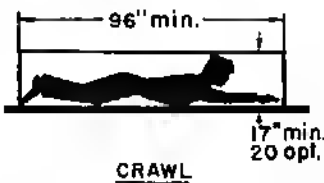


max. hand squeeze: 85 LB. R.H.
77 LB. L.H.

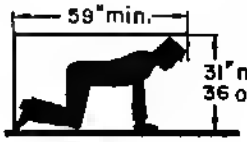
BODY CLEARANCES

SUPINE

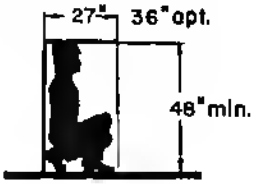
PRONE



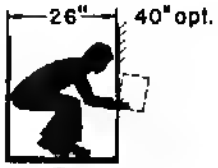
CRAWL



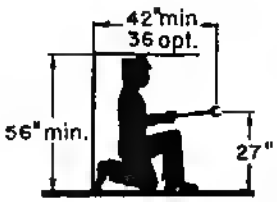
SQUAT



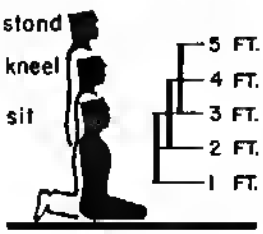
STOOP



KNEEL



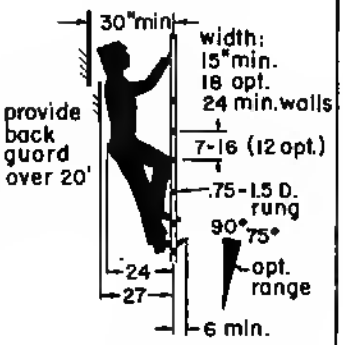
MAINTENANCE REACH LEVELS



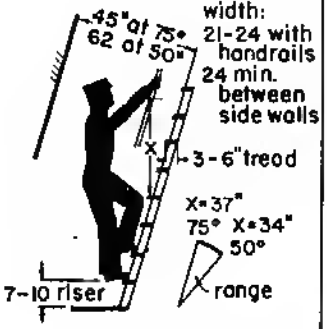
CLIMBING DATA

all data on this sheet accommodates 95% U.S.A. adult males

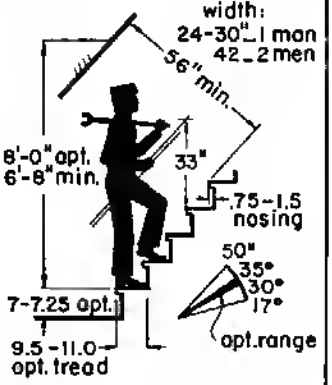
LADDERS



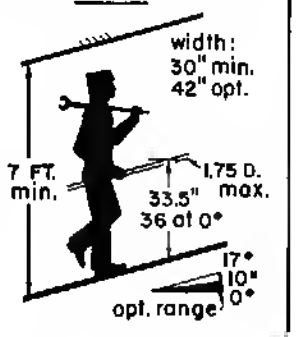
STEP LADDERS



STAIRS



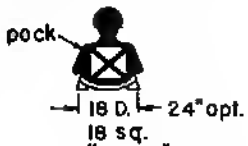
RAMPS



INGRESS & EGRESS

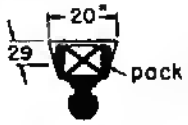
min. entries :
13-18" difficult — 1 man
18-24 fair — 1 man
24-36 good — 1 man
> 36 good — 2 men

MIN. ESCAPE HATCH

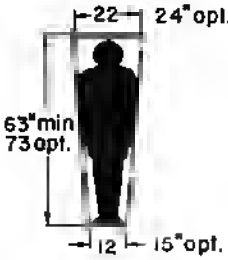


MIN. SIDE HATCH

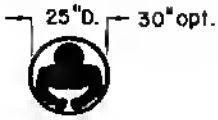
MIN. BELLY HATCH



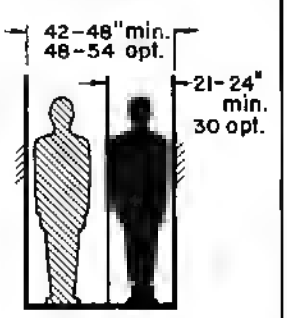
MIN. CATWALK



MIN. CRAWL THRU PIPE



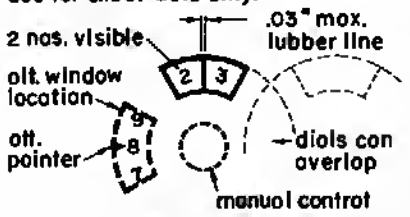
PASSAGE WAYS



13" min. clear. sideways

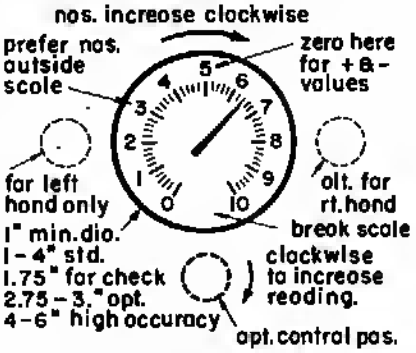
BASIC DISPLAY DATA

OPEN WINDOW DIALS
99 % accuracy in reading
use for exact data only.

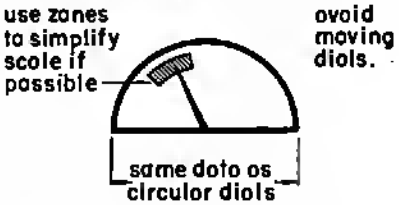


RULE 1. numbers increase clockwise
RULE 2. associated control to move in same direction as dial.
RULE 3. move control clockwise to increase.
not recommended with manual control

CIRCULAR DIALS
89 % accuracy in reading
use for exact, relative or check data.



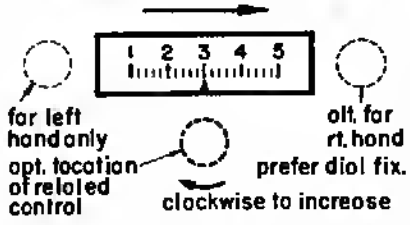
SEMI-CIRCULAR DIALS
83 % accuracy in reading
use for exact, relative or check data.



avoid distracting trademarks on all dials.

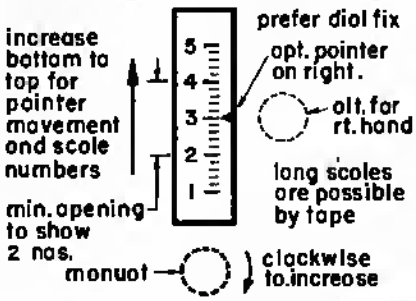
nos. & spacing of scale markings ultimately determines dial sizes.

HORIZONTAL SCALES
72 % accuracy in reading
use for exact, relative or check data.
if scale moves use for exact data only.



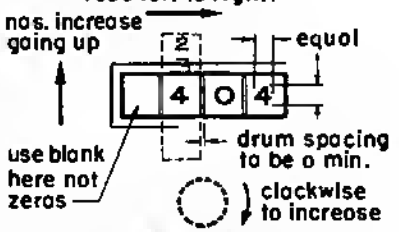
recommend manual & moving pointer

VERTICAL SCALES
64 % accuracy in reading
use for exact, relative or check data.
if scale moves use for exact data only.



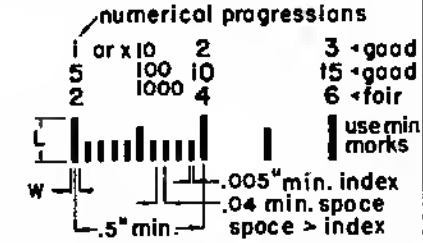
recommend manual & moving pointer

COUNTERS
99 % accuracy in reading
use for exact data only.
rate: 2 nos. per sec. max.



frame to be same color as drums
minimize frame shadows
least count nos. to snap into position

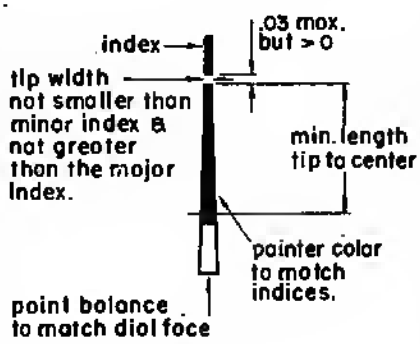
SCALES



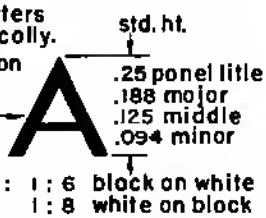
Average data:	L (in.)	W (in.)
major index	.095 S	.015 S
intermediate index	.069 S	.013 S
minor index	.043 S	.011 S

S equals viewing distance in feet

POINTERS



NUMERALS AND LETTERS
all nos. & letters to read vertically.
prefer titles on single line.
futura or U.S.A.F. std. cond. if req.

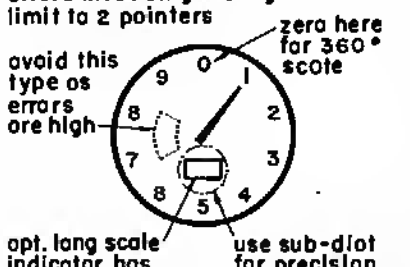


stroke ratio: 1 : 6 black on white
1 : 8 white on black
background contrast: 75 - 80 % +

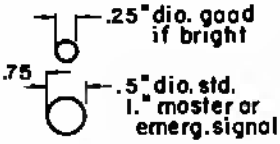
Min. light = 1 ft.L.	min. (in.)	max. (in.)
critical markings	.043 S	.086 S
instructions	.021 S	.086 S
moving markers	.051 S	.086 S

S equals viewing distance in feet

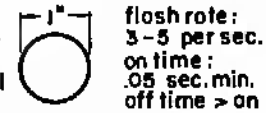
MULTI-REVOLUTION DIALS
avoid multi-pointer dials
errors in reading are high
limit to 2 pointers



SIGNAL LIGHTS
label on top or within.
min. space or rect.

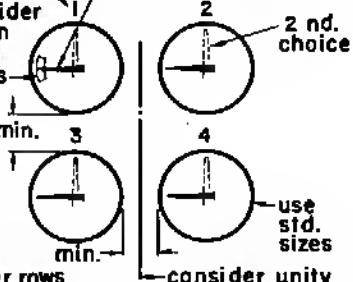


dark background increases eff.



use green for satisfactory.
use red for unsatisfactory.
use amber for impending unsatisfactory.

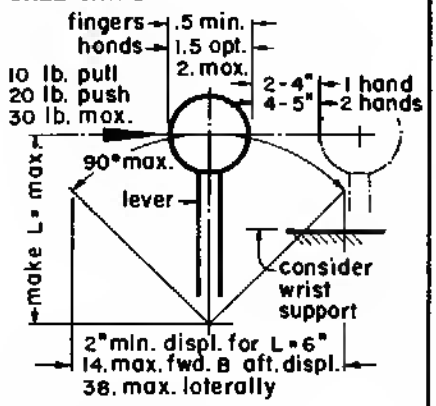
DIAL ARRAY
order of sequence
opt. pointer position for check reading
consider green safe zones



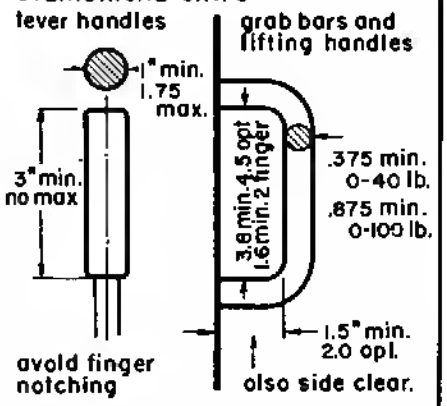
prefer rows to columns.
consider unity & symmetry.
manuals to have relative positions

BASIC CONTROL DATA

BALL GRIPS

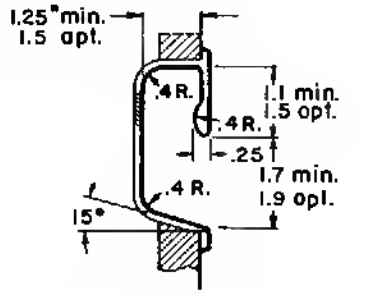


CYLINDRICAL GRIPS



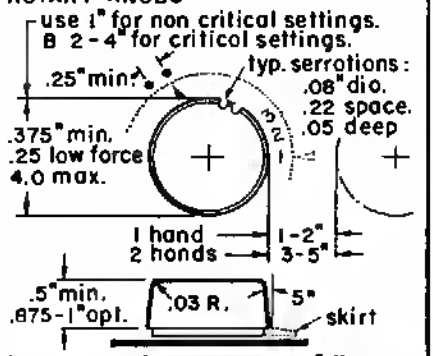
FLUSH PULLS

for door, drawers etc.



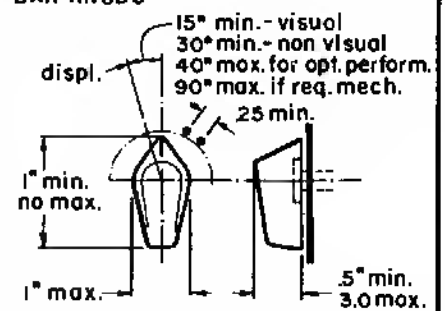
opening width: 3.5" min.
4.0 opt.

ROTARY KNOBS



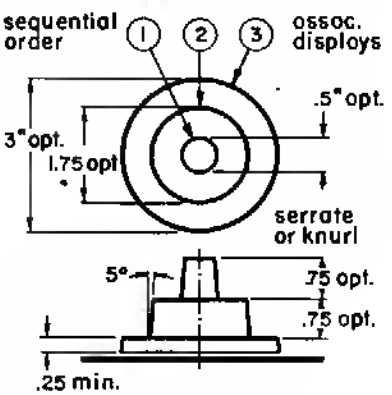
torque: 4.5 in.-oz. max. < 1" dia.
6.0 in.-oz. max. > 1" dia.

BAR KNOBS



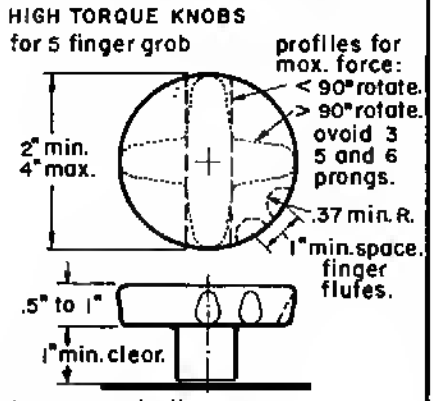
resistance: 12 oz. min. - 48 oz. max.
no. of positions: 24 max.
use round knob for rotation > 180°

GANGED KNOBS



HIGH TORQUE KNOBS

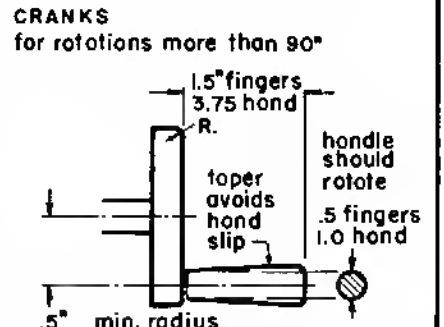
for 5 finger grab



torque: 50 in. lb. max.

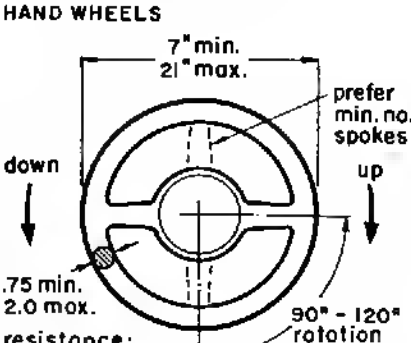
CRANKS

for rotations more than 90°



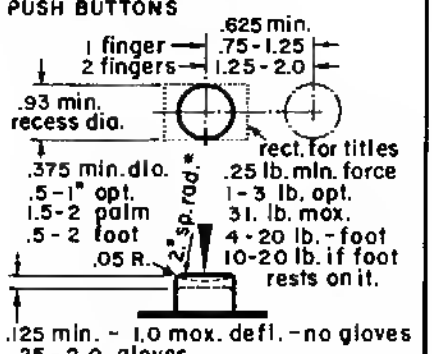
resistance: 5 lb. max. < 3.5" rad.
10 lb. max. 5"-8" rad.

HAND WHEELS



resistance:
5 lb. min.
30 lb. max. - 1 hand
50 lb. max. - 2 hands

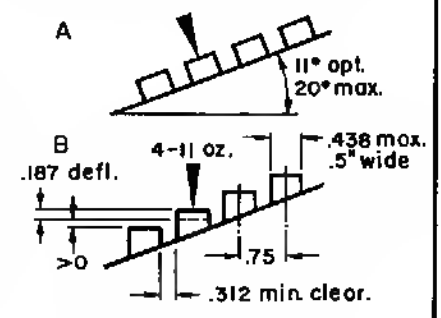
PUSH BUTTONS



.125 min. - 1.0 max. defl. - no gloves
.25 - 2.0 gloves
.5 - 2.0 shoes
1.0 - 4.0 boots
* not required

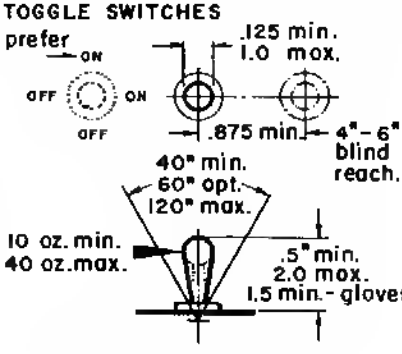
PUSH BUTTONS — TOUCH SYSTEMS

prefer vertical buttons, fig. B



operation rate: 4.1 - 5.3 per sec.

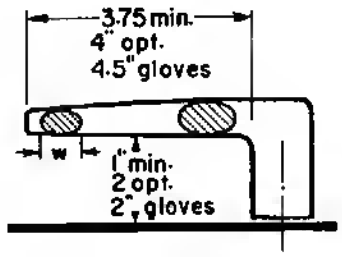
TOGGLE SWITCHES



prefer bat shape
prefer 2 settings to 3 or 4

BASIC CONTROL DATA, PART 2

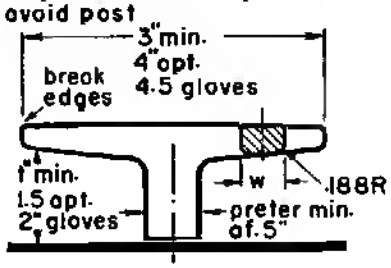
OPEN OR J HANDLE



w=.5" min. for over 40 lb
side clear: 2" ℄ to wall

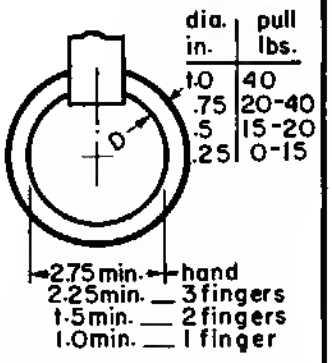
T HANDLE

note: prefer J or stirrup handles to avoid post

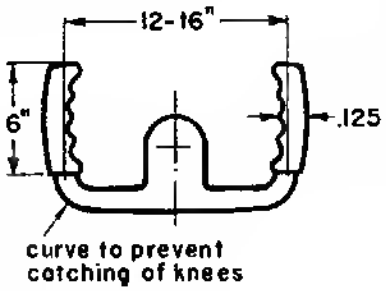


w=.125 up to 15 lb
w=.5" min. for over 40 lb
side clear: 2" to wall

RING PULLS

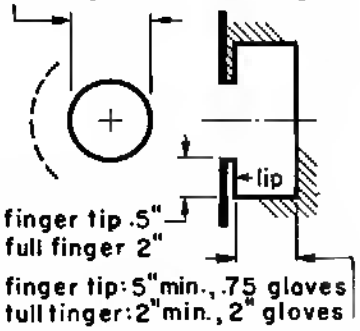


AIRCRAFT HAND WHEEL



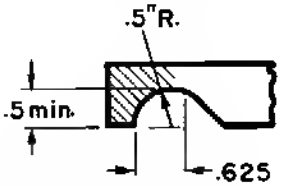
FINGER RECESS PULL

finger tip .75 min., 1" gloves
full finger: 1.25 min., 1.5 gloves



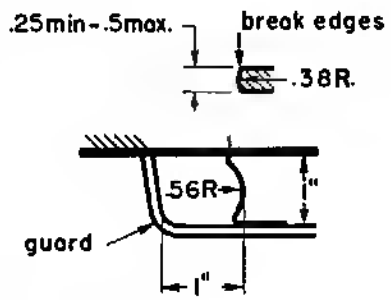
finger tip: .5" min., .75 gloves
full finger: 2" min., 2" gloves

FINGER TIP RECESSED PULL



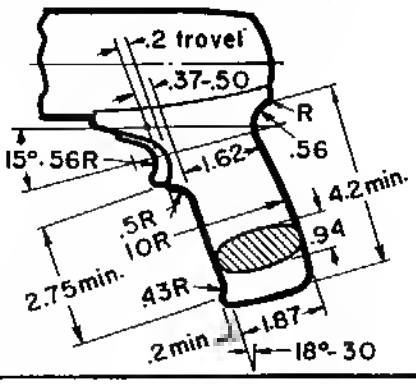
length of recess 3.5 for 4 fingers

TRIGGERS



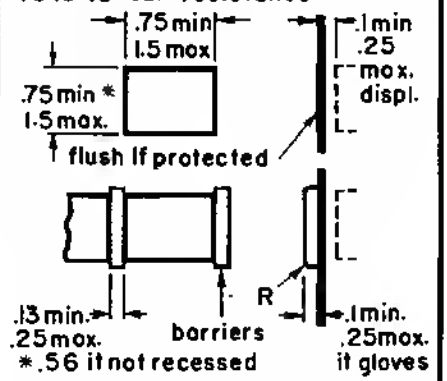
PISTOL GRIP FOR TOOLS

consider shock mtg. if recoil



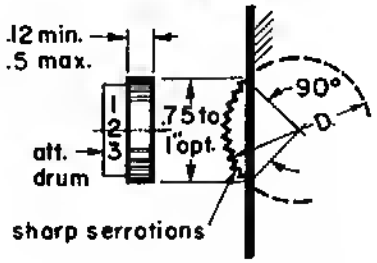
LEGEND SWITCHES

10 to 45 oz. resistance



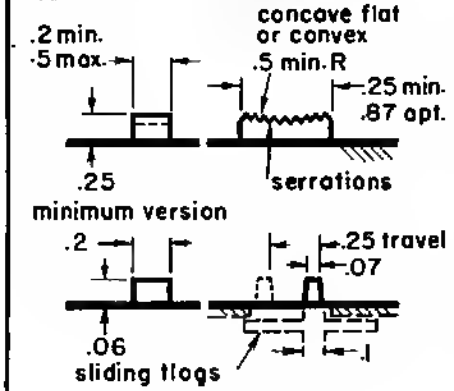
THUMB WHEELS

dia. is 1.5 for 1 in-lb.
2.5 for 3 in-lb.

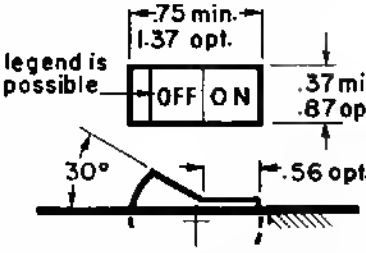


note: avoid markings on wheel which are obscured by fingers

SLIDE SWITCHES



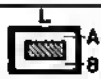
ROCKER SWITCHES



rockers can replace toggles
they give a visual cue of operation
serration on surface not required

ACCESS OPENINGS

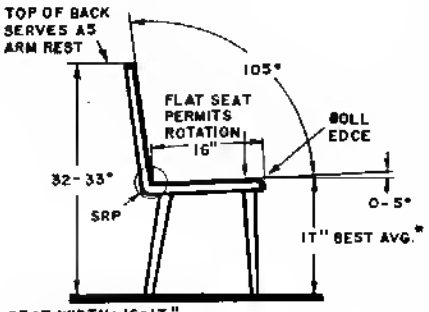
*INDICATES DESCRIPTIDN APPLIES TO DATA TABULATED BELOW

HANDS				
	empty hand held flat	* bore 4x2.25"	* work glaves 6x3"	* arctic gloves 6.5 x 4"
	min. to wrist	3.5 sq.	5.5 sq.	6. sq.
	" " "	3.75 D	5.75 D	6.25 D
	clenched hond	3.5 x 5	4.5 x 6	7 x 6.5
	" " "	5. D	6. D	8.5 D
	inserting 1" object to wrist	3.75 D	6. D	7. D
	using pliers screw driver	5.2 x 4.5 4.2 x 4.6	—	—
	one hand possing object	L = 4" A+B = 1.75	L = 6" A+B = 2.5	L = 6.5" A+B = 2.5
	two hands stroight ahead reach = 6-25"	H = 4 add for vision	H = 6 add for vision	H = 6.5 add for vision
ARMS				
	arm to elbow	—	* clothed 4.5" D	* orctic 7" D
	" " "	—	4.5 sq.	7. sq.
	arm to shoulder	—	5. D	6.5 0
	" " "	—	5. sq.	6.5 sq.
FINGERS				
	one finger	* bare 1.25" D	* gloves 1.5" D	—
	recessed push button	0.93 D	—	—
	twist access eg. hold screw	2. D	2.5" D	—
FOOT				
	access to pedal	bore 4.3x11.5	avg. shoe 4.7 x 12.7	arctic boot 6.3x15.3
HEAD				
	head passage	bare 9.3"	military helmet 11. 5"	work helmet 12.5"

BODY				
	manhole	work clothes 22.8	—	space suit 36"0
	crawl thru pipe	* min. avg. clothes 25" I.D.	* prefer 30" I.D.	* arctic clothes 32" I.D.
	ceiling and floor hatch	18" D	22" D	32" D
	" "	18 sq.	22 sq.	32 sq.
	wall hatch	18 x 15	22 x 20	32 x 24
	side hatch incl. pack	20 x 32	—	—
	belly hatch incl. pack	20 x 29	—	—
	crawl thru	20 x 31	22 x 36	30 x 38
	prane access	22.8 x 17	30 x 20	30 x 24
	catwalk	22" H = 63 12	24" H = 73 15	32" H = 75 15
	normal pass poss sideways	22 x 76 13 x 76	30 x 80 15 x 80	30 x 80 19 x 80
	pressure hatch	20 x 44 A=16" to floor	26 x 66 A=10" to floor	—
	head bent head erect	20 to 24 x 60 20 to 24 x 70	30 x 70 30 x 80 to 84	30 x 70 30 x 80 to 84
	two men facing each other	30 x 76	36 x 80 to 84	36 x 80 to 84
	two men passing abreast	42 x 76	54 x 80 to 84	60 x 80 to 84

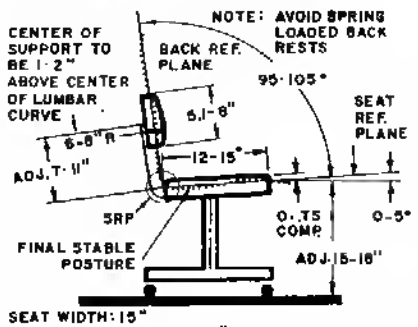
SEATING

1 CONVENTIONAL STRAIGHT CHAIR
FOR SHORT DURATIONS
USED FOR STUDY, WORK, & EATING



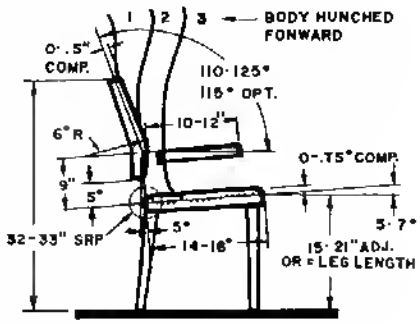
SEAT WIDTH: 16-17"
*HIGH FOR SOME WOMEN (14-15" MAY BE REQ.)
(OR USE FOOT STOOL)

2 WORK CHAIR
FOR LONG PERIODS
USED FOR STUDY, TYPING, & CONSOLES



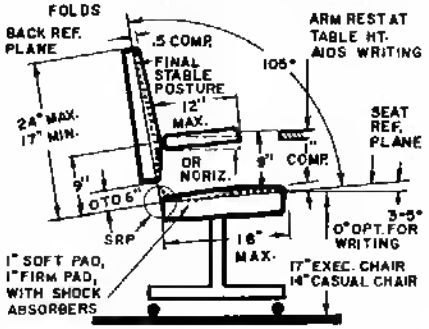
SEAT WIDTH: 15"
BACK REST WIDTH: 12-14"
BACK REST CONCAVITY: 16-18"

3 THREE POSTURE WORK CHAIR
FOR LONG PERIODS



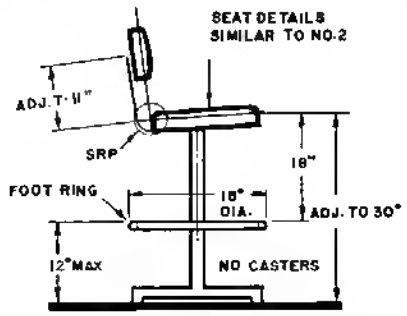
SEAT WIDTH: 13.6-15.8"
ARM REST, INSIDE SPACING: 18" MIN.

4 EXECUTIVE AND CASUAL CHAIR
APPLIED TO THEATER CHAIRS IF FIXED & SEAT FOLDS



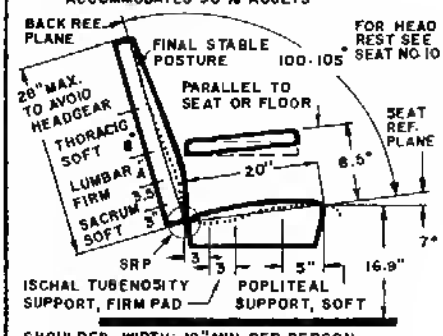
SEAT WIDTH: 19" MIN.
ARM REST INSIDE SPACING: 19"
ARM REST WIDTH: 2"

5 HIGH CHAIR FOR STAND
ALSO USED FOR DRAFTING AND AT COUNTERS



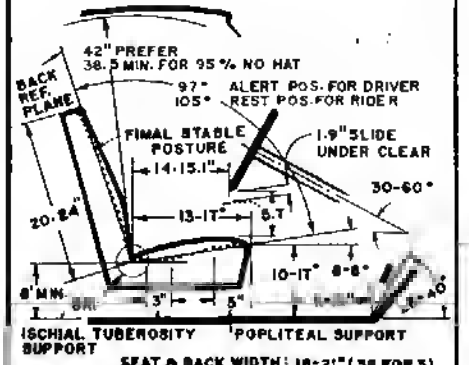
PREFER FIXED FOOT REST ON CONSOLE

6 RAILROAD SEATING
ACCOMMODATES 90% ADULTS



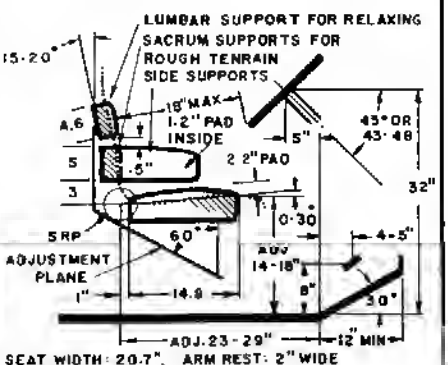
SHOULDER WIDTH: 19" MIN. PER PERSON
HIP WIDTH: 19" MIN. PER PERSON
ARM REST WIDTH: 2"

7 AUTOMOBILE, TRUCK & TANK
INCLUDES LOW SILHOUETTE SEATING



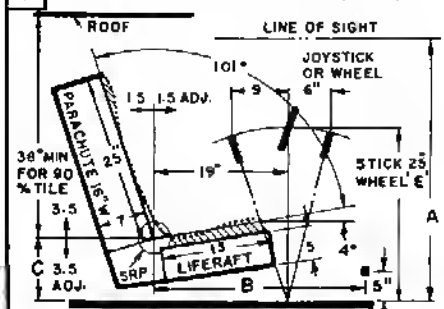
SEAT & BACK WIDTH: 18-21" (36 FOR 3)
VERT. SEAT ADJ. 5" HORIZ. SEAT ADJ. 8" TOTAL

8 TRACTOR SEAT
WITH LEG STABILITY



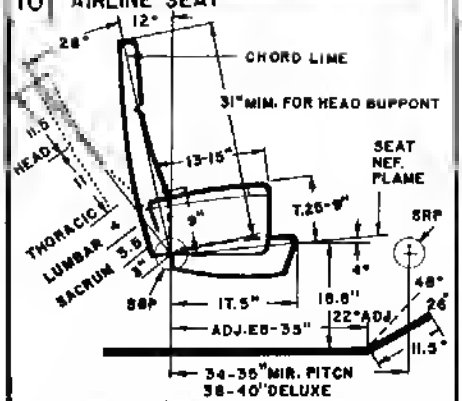
SEAT WIDTH: 20.7", ARM REST: 2" WIDE
LUMBAR SUPPORT WIDTH: 10"

9 AIRCRAFT COCKPIT SEAT (MIL.)



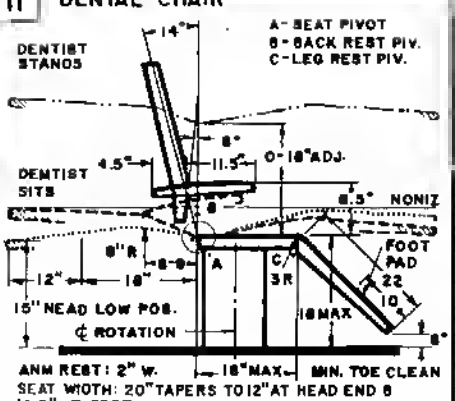
	A	B	C	D	E
CHOOSE EYE LEVEL	37	36	6.75	10°	27.0
	39	25	8.25	8°	28.5
	41	34.5	9.5	5°	30.5
H - A	43	34.5	11.25	5°	32.0

10 AIRLINE SEAT



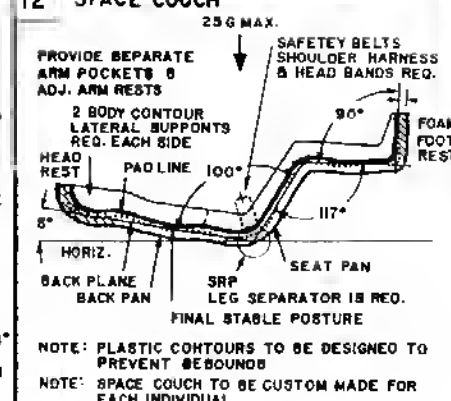
SEAT WIDTH: 21" MIN. > 1 HR. & 19" < 1 HR.

11 DENTAL CHAIR



ARM REST: 2" W. 18" MAX MIN. TOE CLEAR
SEAT WIDTH: 20" TAPERS TO 12" AT HEAD END & 16.5" AT FOOT

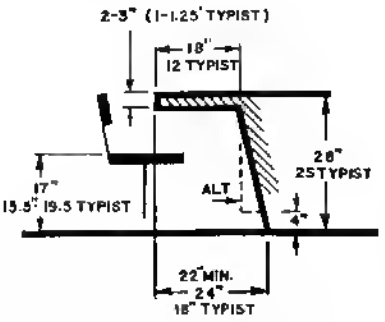
12 SPACE COUCH



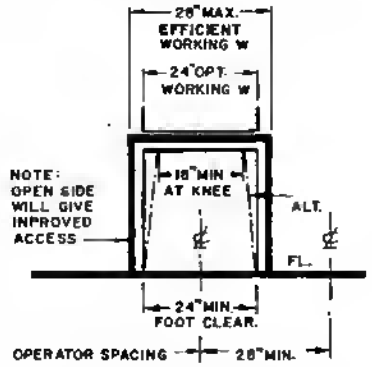
NOTE: PLASTIC CONTOURS TO BE DESIGNED TO PREVENT BEBOUNDS
NOTE: SPACE COUCH TO BE CUSTOM MADE FOR EACH INDIVIDUAL

CONSOLES

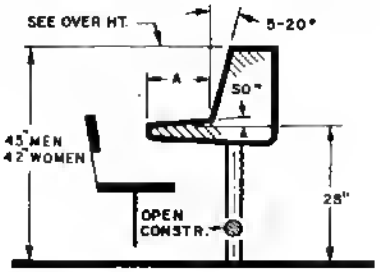
1 OFFICE AND TYPIST DESK



2 WIDTH AND KNEE HOLE DATA
FRONT VIEW

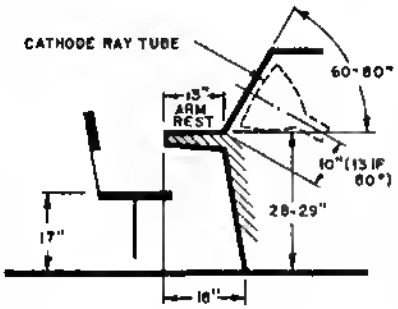


3 SMALL CONSOLE, SIT DOWN

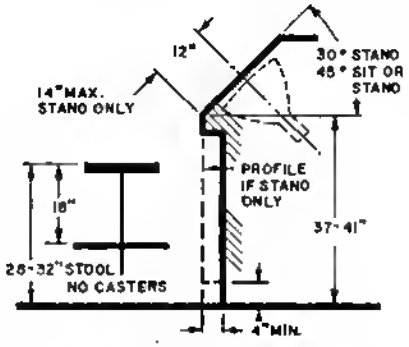


OPEN CONSOLE PROVIDES VENTILATION
REMOTE NOISY AND HOT EQUIPMENT
NOTE: IF STANCHIONS ARE USED PROVIDE
24" CLEAR FOR OPERATOR

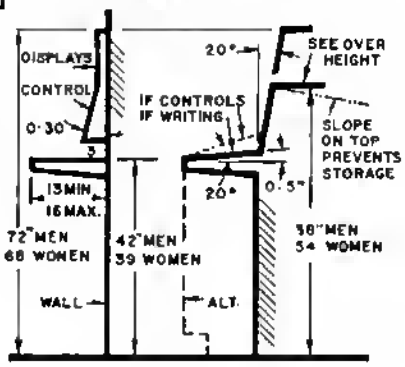
4 CRT CONSOLE SIT DOWN



5 CRT CONSOLE SIT OR STAND

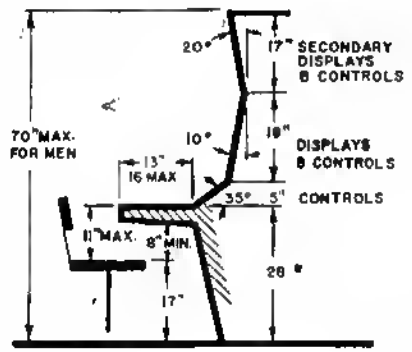


6 STAND UP CONSOLES



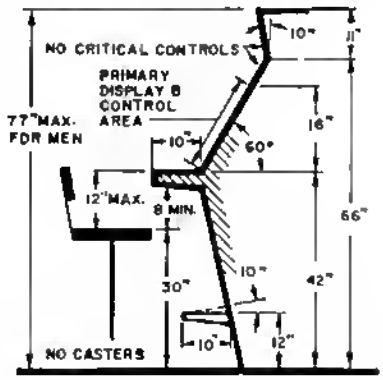
SHELF MAY NOT BE REQUIRED

7 COMPOUND SIT DOWN



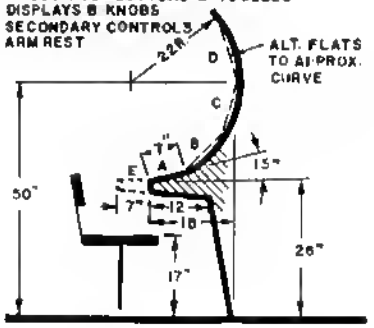
* 29" HT IF CHAIR IS 18"

8 COMPOUND SIT OR STAND

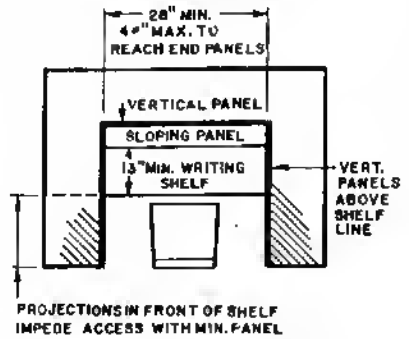


9 CURVED PANEL SIT DOWN

A PUSH BUTTON & KEY BOARD
B KNOBS PUSH BUTTONS & TOGGLES
C DISPLAYS & KNOBS
D SECONDARY CONTROLS
E ARM REST

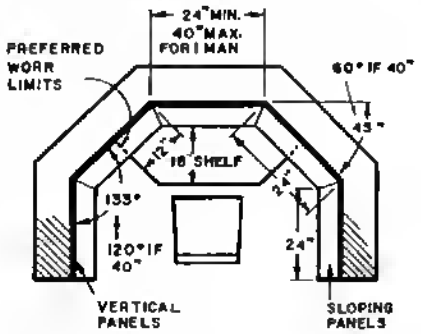


10 U SHAPE WRAP-AROUND
FOR INCREASED WORK SPACE



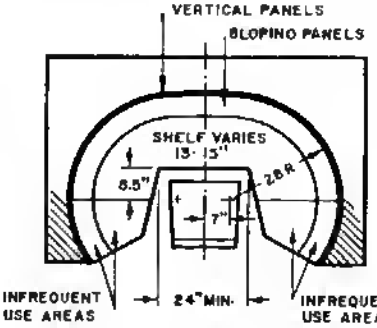
NOTE: CHAIR TO SWIVEL AND HAVE CASTERS

11 SPREAD U
IMPROVED VISIBILITY AND ACCESS



NOTE: CHAIR TO SWIVEL AND HAVE CASTERS

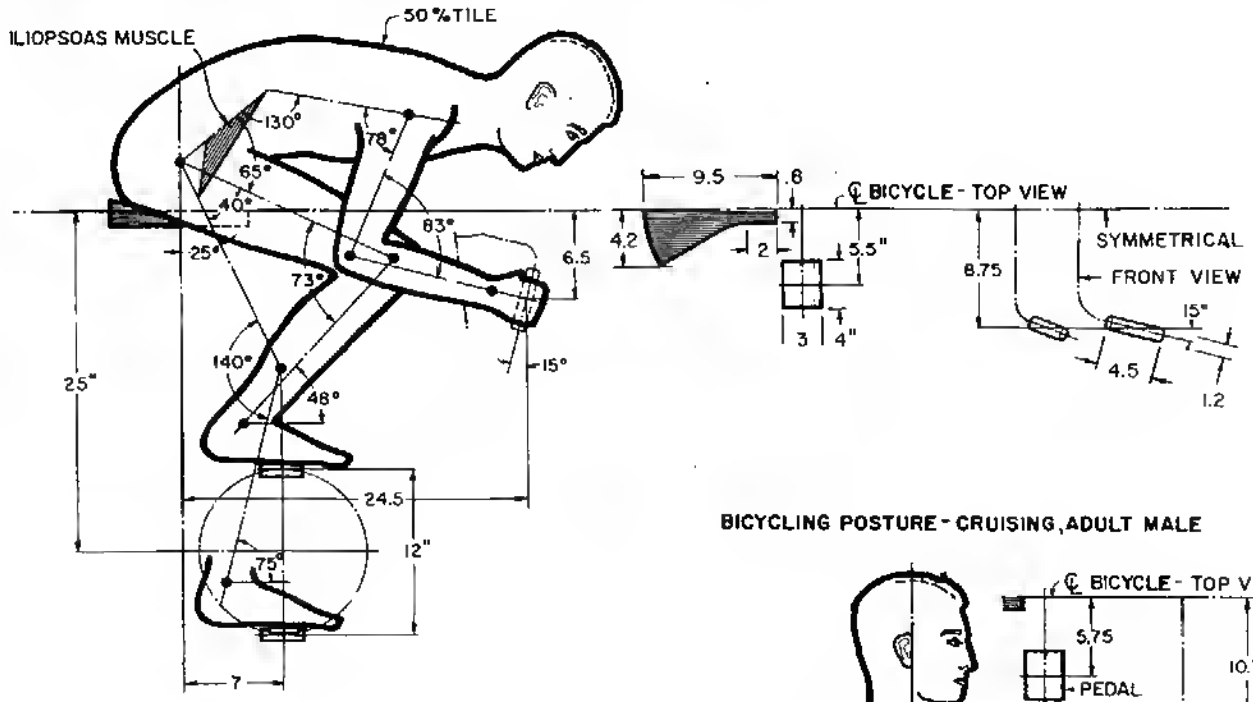
12 SEMI-CIRCULAR
CAN HAVE HEMISPHERICAL PANELS



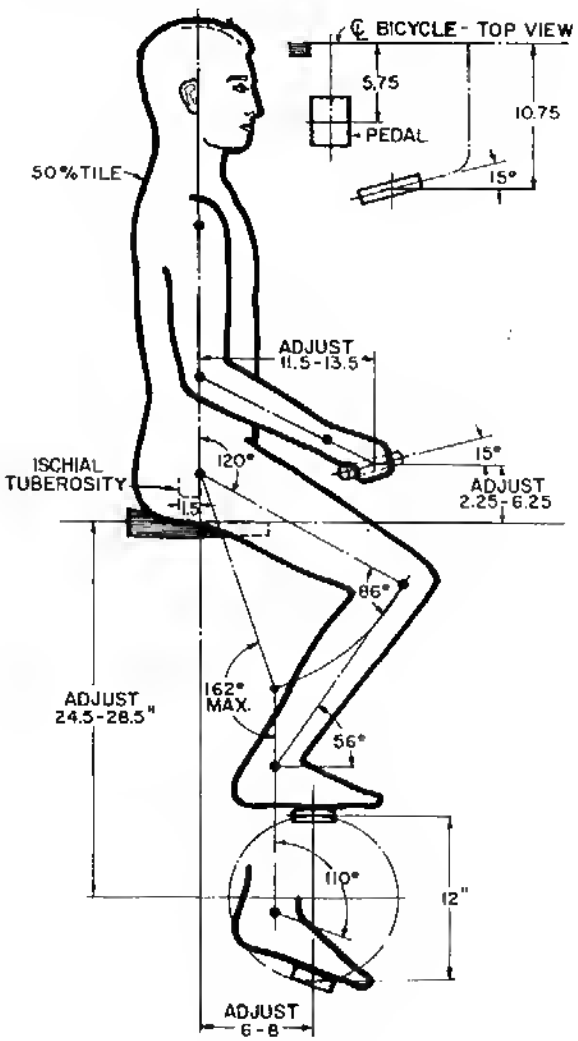
NOTE: CHAIR TO SWIVEL AND HAVE CASTERS

BICYCLES

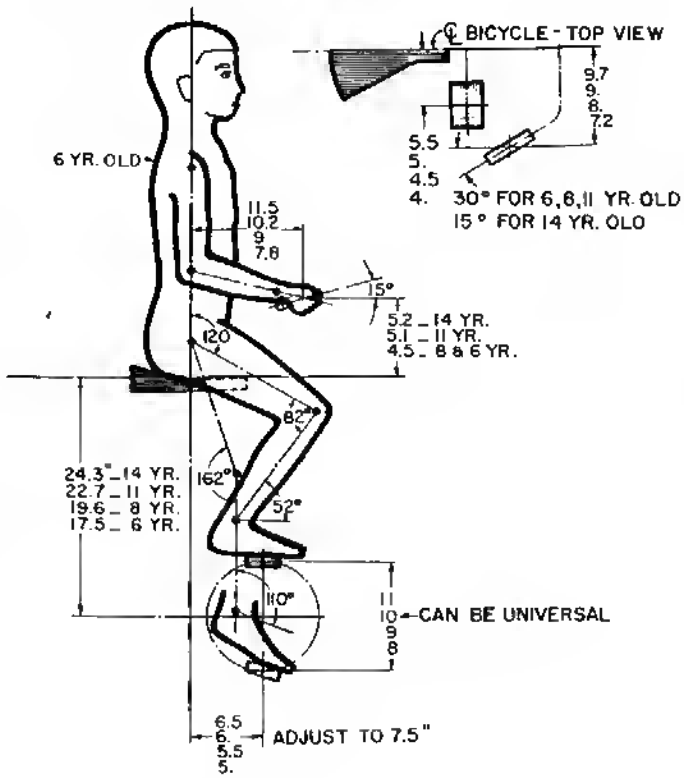
BICYCLING POSTURE - RACING, ADULT MALE



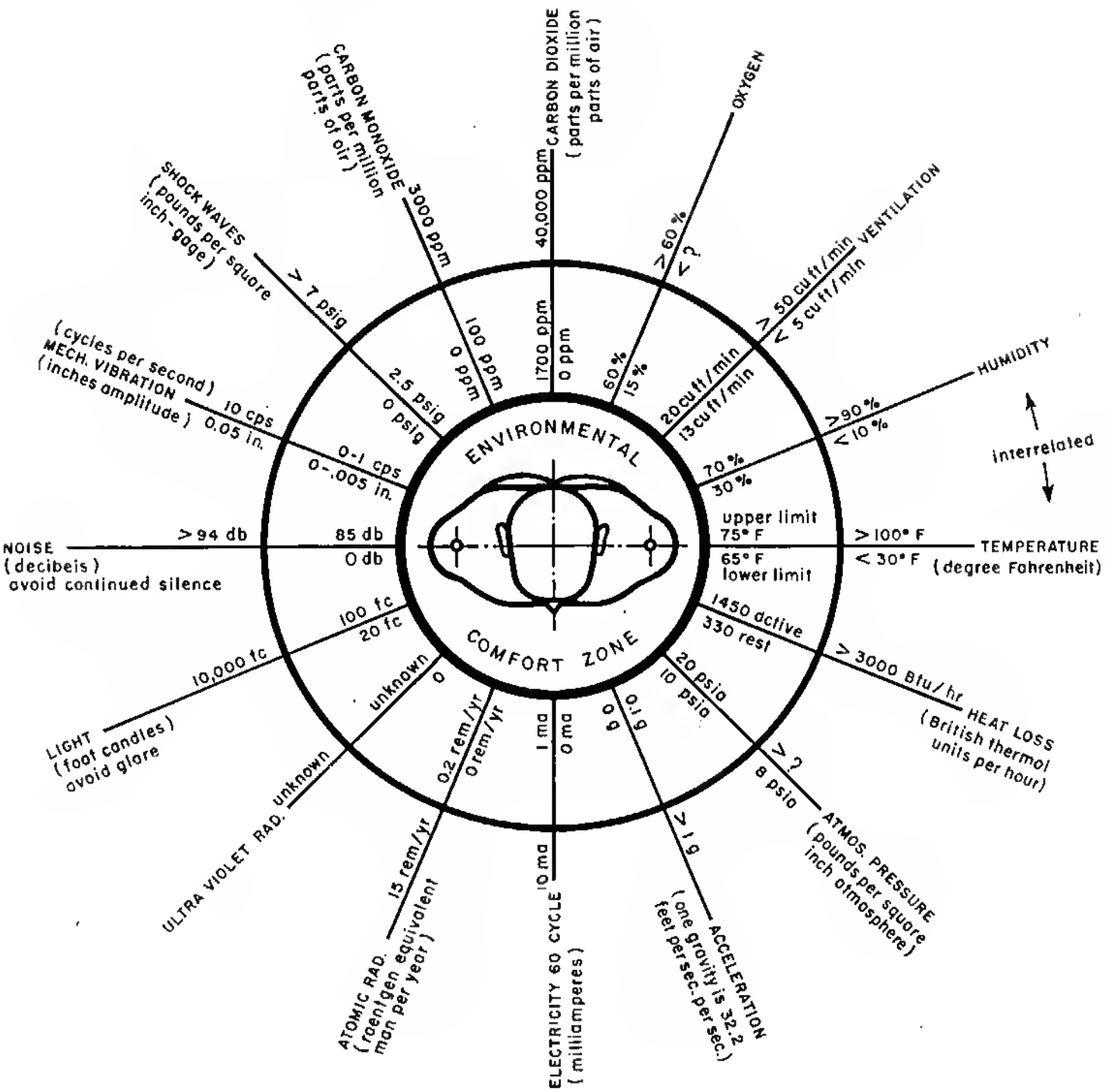
BICYCLING POSTURE - CRUISING, ADULT MALE



BICYCLING POSTURE - CRUISING, JUVENILE GROUP
14, 11, 8 & 6 YR. OLD BOYS



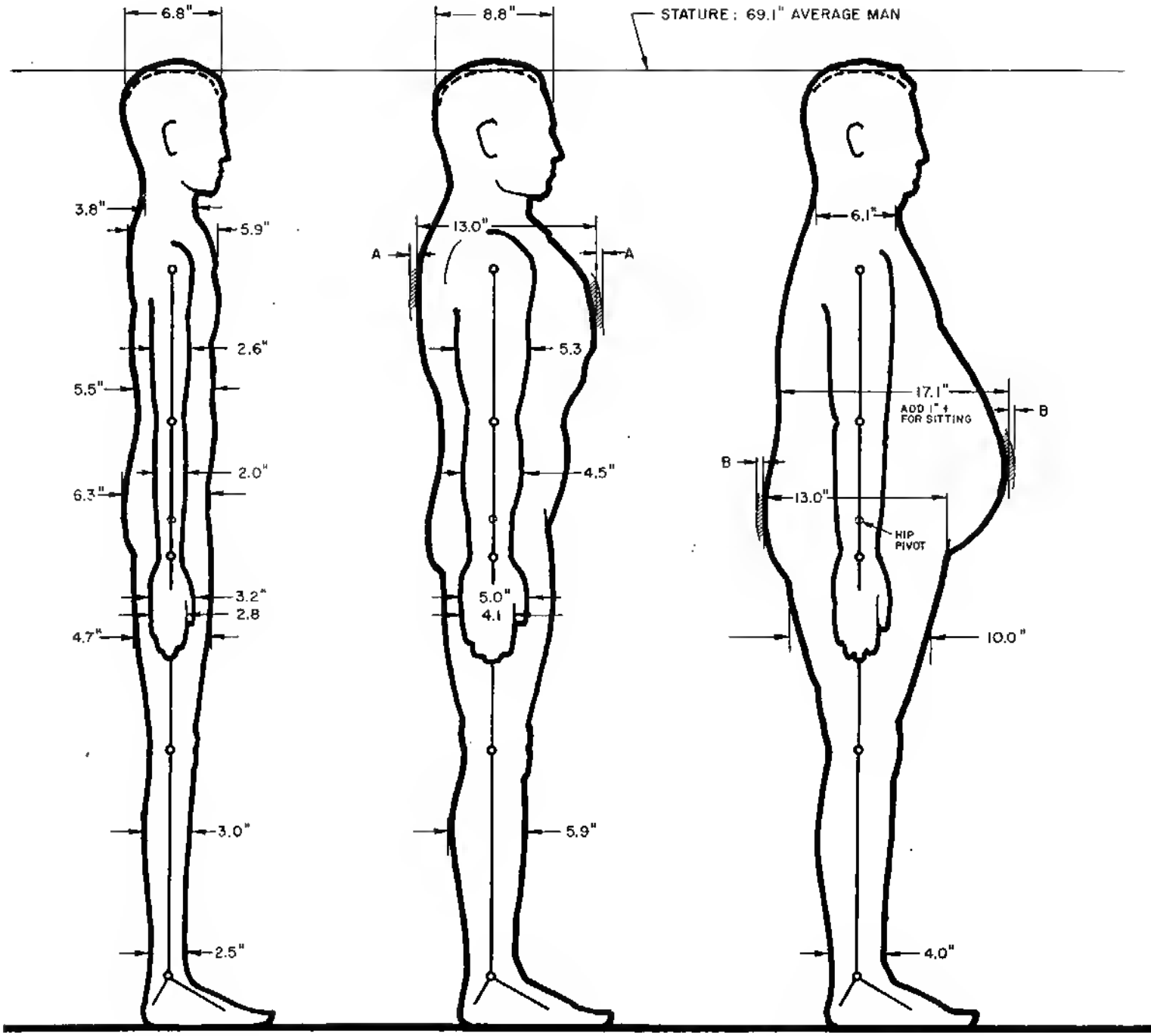
ENVIRONMENTAL TOLERANCE ZONES



THE BAND BETWEEN THE CIRCLES INDICATES THE ZONE FROM COMFORT TO THE TOLERANCE LIMIT. OUTSIDE THIS LIMIT GREAT DISCOMFORT OR PHYSIOLOGICAL HARM IS ENCOUNTERED. OTHER FACTORS NOT SHOWN AND TO BE CONSIDERED ARE: INFRA-RED RADIATION, ULTRA-SONIC VIBRATIONS, NOXIOUS GASES, DUST, POLLEN, CHEMICALS & FUNGI.

THREE BASIC HUMAN BODY TYPES

EXTREME VARIATIONS OF THE AVERAGE MAN IN THE U.S.A.
MOST MEN FALL SOMEWHERE IN BETWEEN THESE TYPES.
ALL VALUES ARE TYPICAL RANGE MEASUREMENTS.

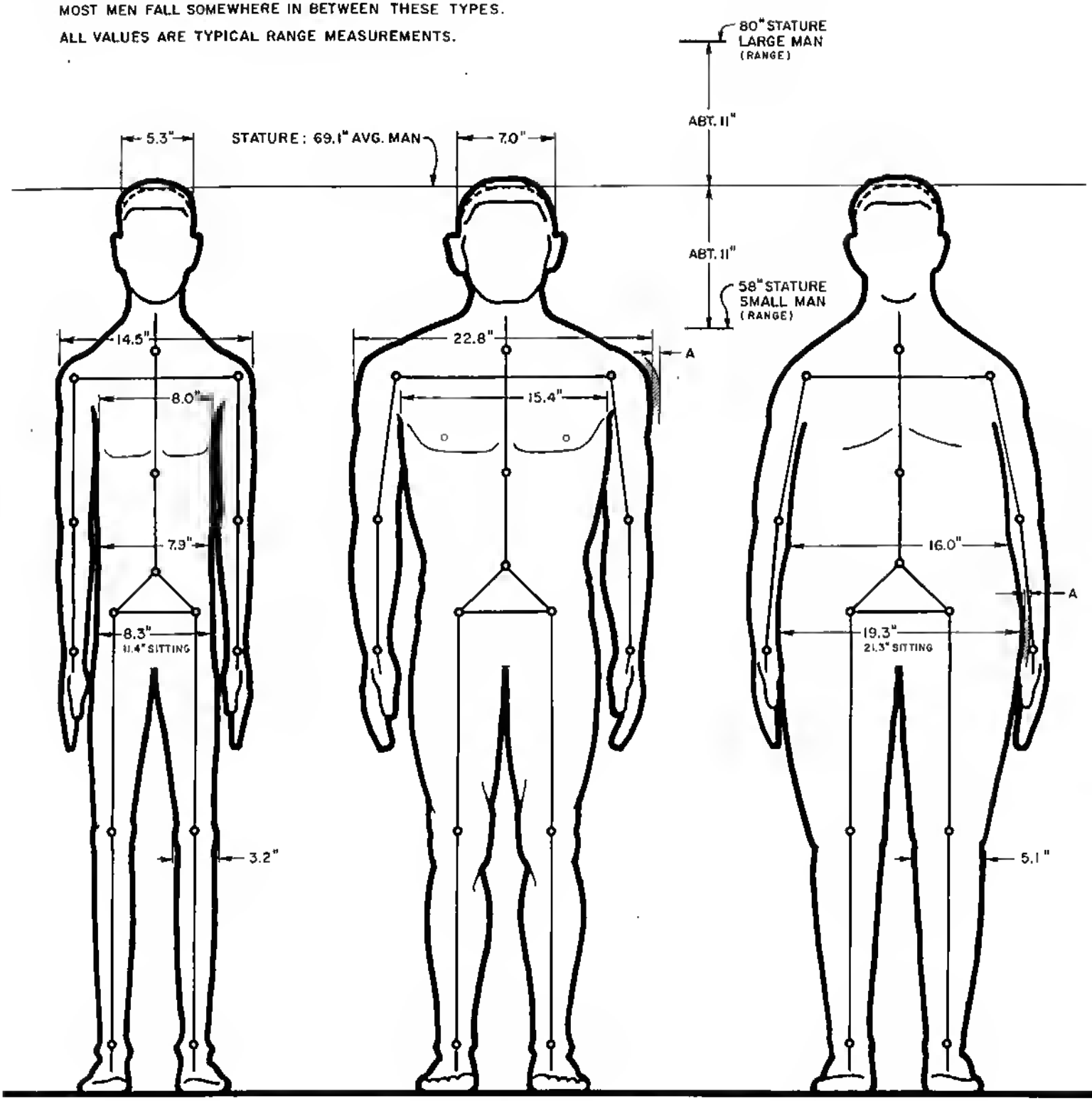


CLOTHING THICKNESS: A = 0.25" LIGHT, 0.75" HEAVY
B = 0.5" LIGHT, 1.0" MEDIUM, 1.25" HEAVY

ECTOMORPH MESOMORPH ENDOMORPH

THREE BASIC HUMAN BODY TYPES

EXTREME VARIATIONS OF THE AVERAGE MAN IN THE U.S.A.
MOST MEN FALL SOMEWHERE IN BETWEEN THESE TYPES.
ALL VALUES ARE TYPICAL RANGE MEASUREMENTS.



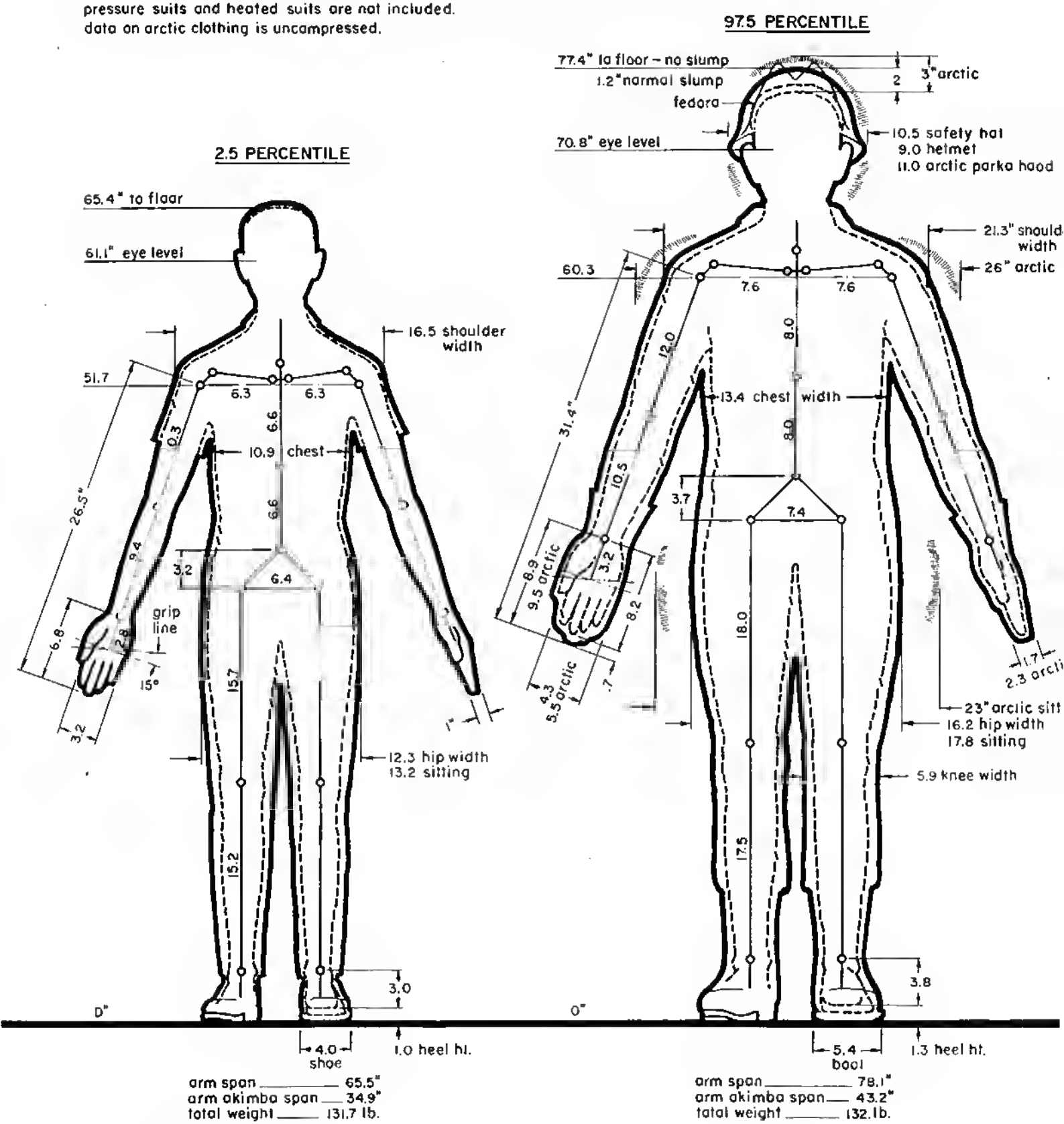
CLOTHING THICKNESS: A = 0.15" LIGHT AND 0.75" HEAVY

ECTOMORPH MESOMORPH ENDOMORPH

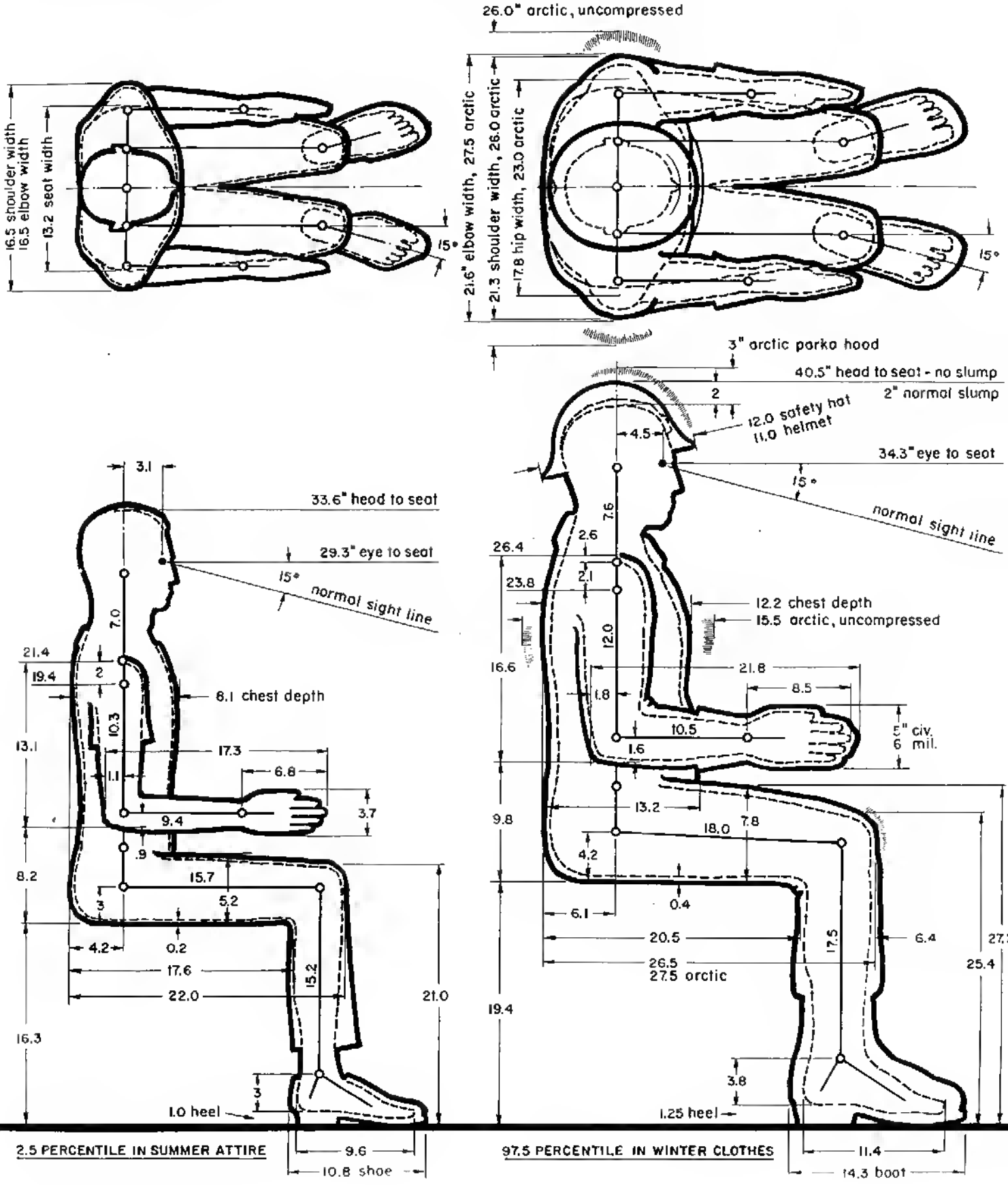
COMPARISON OF THE 2.5 PERCENTILE U.S. ADULT MALE IN SUMMER ATTIRE AND THE 97.5 PERCENTILE IN HEAVY WINTER CLOTHES.

A DESIGN WHICH INCLUDES THESE 2 MEN WILL ACCOMMODATE 95 PERCENT UNDER MOST CLIMATIC CONDITIONS.

dimensions include all types of Army gear, heavy winter flying clothes (A.F.), and civilian work and street clothes.
pressure suits and heated suits are not included.
data on arctic clothing is uncompressed.

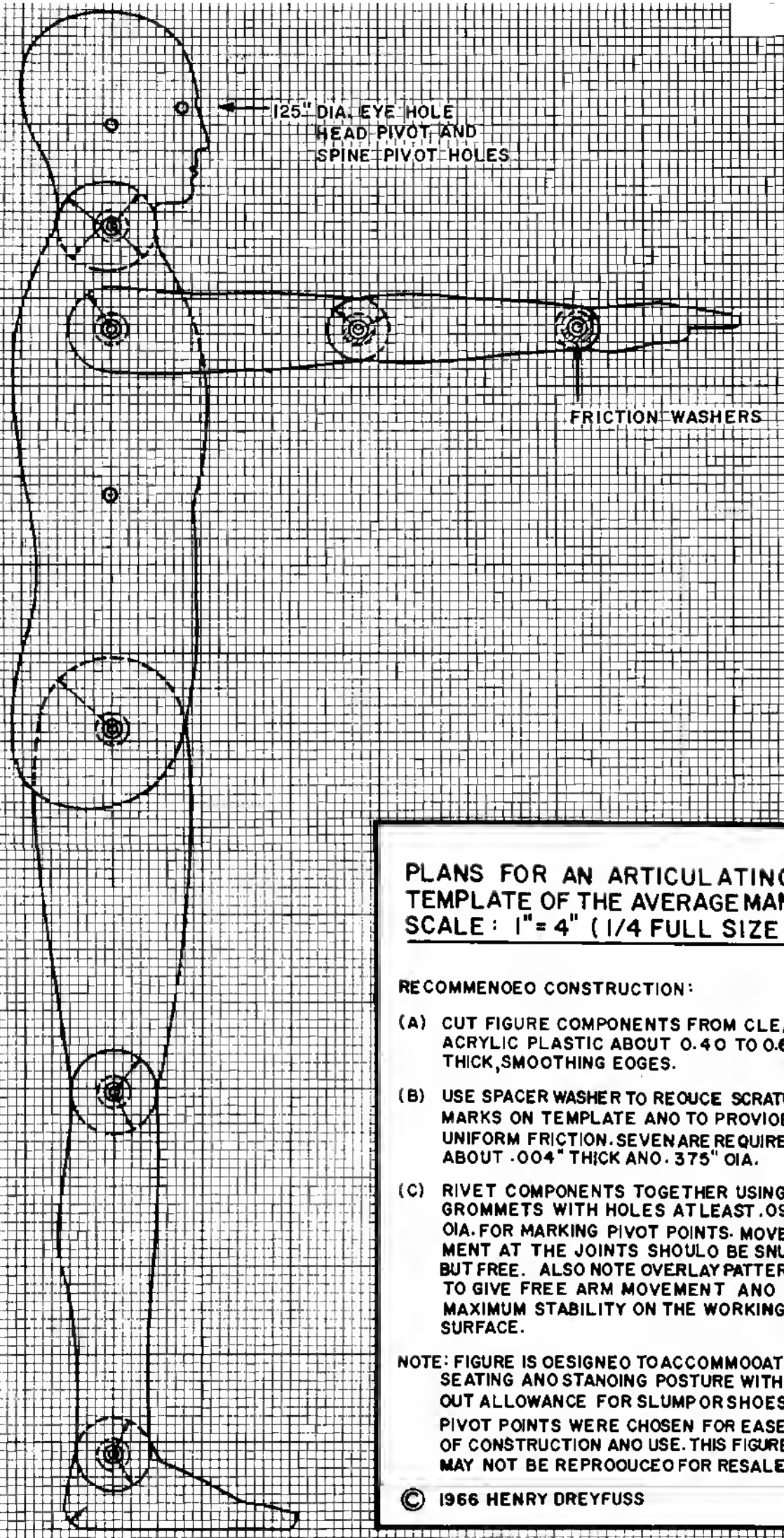


COMPARISON OF 2.5 PERCENTILE U.S. ADULT MALE IN SUMMER ATTIRE AND THE 97.5 PERCENTILE IN HEAVY WINTER CLOTHES



2.5 PERCENTILE IN SUMMER ATTIRE

97.5 PERCENTILE IN WINTER CLOTHES



PLANS FOR AN ARTICULATING TEMPLATE OF THE AVERAGE MAN SCALE: 1"= 4" (1/4 FULL SIZE)

RECOMMENDED CONSTRUCTION:

(A) CUT FIGURE COMPONENTS FROM CLEAR ACRYLIC PLASTIC ABOUT 0.40 TO 0.62" THICK, SMOOTHING EDGES.

(B) USE SPACER WASHER TO REDUCE SCRATCH MARKS ON TEMPLATE AND TO PROVIDE UNIFORM FRICTION. SEVEN ARE REQUIRED ABOUT .004" THICK AND .375" DIA.

(C) RIVET COMPONENTS TOGETHER USING GROMMETS WITH HOLES AT LEAST .094 DIA. FOR MARKING PIVOT POINTS. MOVEMENT AT THE JOINTS SHOULD BE SNUG BUT FREE. ALSO NOTE OVERLAY PATTERN TO GIVE FREE ARM MOVEMENT AND MAXIMUM STABILITY ON THE WORKING SURFACE.

NOTE: FIGURE IS DESIGNED TO ACCOMMODATE SEATING AND STANDING POSTURE WITHOUT ALLOWANCE FOR SLUMP OR SHOES. PIVOT POINTS WERE CHOSEN FOR EASE OF CONSTRUCTION AND USE. THIS FIGURE MAY NOT BE REPRODUCED FOR RESALE.